# ANATOMY
## OF THE
# BONES MUSCLES
## AND
# JOINTS
## BY
# JOHN BELL
## SURGEON

Sa Soja Rajah 1817

2099

# ENGRAVINGS

OF THE

*BONES, MUSCLES, and JOINTS*

ILLUSTRATING

THE

FIRST VOLUME

OF THE

## ANATOMY OF THE HUMAN BODY.

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BY JOHN BELL, SURGEON.

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THIRD EDITION.

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TO

# Dr. DANIEL RUTHERFORD,

PROFESSOR OF MEDICINE AND BOTANY,

AND

PHYSICIAN TO THE ROYAL INFIRMARY,
EDINBURGH.

SIR,

IN presenting this Book of Plates to one who is so well able as you are to judge of their defects, I ought to add some value to the offering, by declaring the motives of it.—It is a mark of gratitude for the friendly care with which, in company of my worthy Master, you watched over me during a long and dangerous illness. Perhaps there can be no higher compliment betwixt medical men, than this confidence in time of sickness; and surely, if I may judge from my own feelings, nothing can be more grateful than the remembrance of kindnesses bestowed at such a time.——May your skill be long useful to your fellow-citizens; and may it be always valued as I value it.

I am,

SIR,

With respect,

Your Friend, and Humble Servant,

JOHN BELL.

# PREFACE.

WHEN a young man, who had been blind from his childish years, had his sight restored to him by our celebrated surgeon CHESSELDEN, all his thoughts, and feelings, and pleasures, and pains, were very interesting to his friends; for that most delightful of our senses was to him as a dream of fairy visions, confused, yet delightful, beyond all that the fancy can conceive. "He was like one newly born into the world, needing to "learn anew all the objects around him, knowing nothing by the eye, "but all by the touch. It was long before he found out that pictures "represented solid bodies, and then he was much surprised that those "things, which to the eye seemed prominent and round, were to the "touch quite even and flat; he asked his friends which was indeed the "lying sense, feeling or seeing."

"Being shown his father's picture in a locket, at his mother's watch, "and told what it was, he acknowledged a likeness, but was vastly sur-"prised; asking, how it could be that a large face could be expressed "in so little room; saying, it should have seemed as impossible to him, "as to have put a bushel of any thing into a pint."

Now there are many, who having enjoyed and used this precious sense during all their lives, have never come to know, like this young man, that, even within the narrowest circle, the representation is as perfect and true, as in the full size of the human body; foolishly imagining that nothing can be drawn but of its natural size. If a man were to take this fancy, that nothing of anatomy could be drawn but of the full size of life, with what high contempt must he look down upon these little plates; where I have endeavoured to represent, in this miniature form, what it must be confessed, might be more fully represented on a larger scale: and yet I am sensible, that those, who cannot understand these plates, will hardly profit even by that stately anatomical figure of full six feet high,



which

which, being cut in copper, with googes, and chissels, and mallets, and all kinds of instruments, must establish a reputation for its author, which, if not high, will not fail to be at least of a lasting kind; neither apt to be forgotten, nor liable, like other discoveries to go astray.

"As I proceeded in writing a book of anatomy, I felt more and more, "at every step, the necessity of giving plates to it;" for a book of anatomy without these seemed to me no better than a book of geography without its maps; it was, in my mind, like teaching mathematics without diagrams, or solving Euclid's problems without the help of figures or lines, by the mere force of imagination alone. Indeed any one, who, studying without some help of plates, tries to understand and to remember an anatomical description with no other representation than words merely, will feel, that he is like one attempting to work a rule of arithmetic without the use of cyphers, trying to remember the value and denomination of each part throughout the whole train of numbers; he is ingenious in difficulties, making an abstract subject of one belonging to the senses chiefly, and attempting to obtain by words, those ideas which must come to him only through the eye.

It was while I was writing anatomical descriptions that I first thought of drawings, and of placing my subjects in those very shapes and postures in which they were explained:—and I conceived, that the descriptions and the drawings might thus be wrought into one perfect whole; being as two parts of one idea, or as one idea presented in a double form, once to the eye, and once again to the ear. If, in any material points, my drawings and descriptions shall thus agree, then must the ideas be made out to my readers clear and fair; and should insinuate themselves into his mind without labour or thought on his part; while he is not toiling from descriptions to drawings; not harrassed with continual interruptions, incongruous ideas, parts described but not represented, or represented and not described; not travelling far and wide from the ideas of one author, to the representation of another; never trying to associate ideas which have no affinity, nor striving to bring drawings and descriptions together which are as far, as may be, from being parts of the same idea, or from being capable of that close comparison which the student seeks, and misses with a disappointment which is continually renewed. Such must be the student's labour, (a labour which might well oppress the most active mind,) if the teacher

be

be not careful to preserve for him this correspondence of ideas; whether he be employed in comparing his lecture with the subject lying before him, or his drawings with his book.

From the first dawnings of anatomical knowledge, or at least from the very earliest invention of anatomical plates, this vitious practice has prevailed, that each author, careless of this correspondence of ideas; never thinking of the harmony that ought still to subsist between those notions which are to be conveyed by words, and those which speak to the eye, in the truer language of this subject; intending merely to write a book, and rather with the hopes of procuring himself a name, than with the prouder expectation of multiplying and varying the sources of instruction, writes his book after his own way; and takes his plates, perhaps, where he is directed by his bookseller, or where he may most safely steal; and often chusing them of a fashion fifty years older than that book, into the gaps and interstices of which, they are to be nitched and stuck up, wherever they will make the handsomest figure, not where they will be of the most use.

This ironical praise may be very safely given to the older anatomists for their love of original drawings, that having once set their taste to one certain system of plates, they have been very constant and true to their first choice. It is thus that the plates of Vesalius, Fallopius, or Eustachius, have descended, with some distortions and abridgements indeed, but still unpolluted with any stain of originality, nor vitiated by any one improvement of representation or of thought, through the books of Vidus Vidius, Pareus, Stephanus, Blanchardus, Veslingius, Riolanus, Verhein, Palfin, Dionis, and a thousand others. Thus have the once beautiful plates of Vesalius, (mangled and deformed, cut down to suit books of all sizes, twisted and accommodated to all subjects and all forms of explanation,) descended to us in such distorted shapes, that while we are looking over their books to fix upon them this indictment of plagiarism, we can hardly recognise the original drawings so fairly as to prove the deed.

Even in the first invention of our best anatomical figures, we see a continual struggle between the anatomist and the painter; one striving for elegance of form, the other insisting upon accuracy of representation. It was thus that the celebrated Titian consented to draw for Vesalius: Though it is but too plain that there can be no truth in drawings, thus

thus monstrously compounded betwixt the imagination of the painter, and the sober remonstrances of the anatomist, striving for accurate anatomy, where the thing cannot be; for those figures, which are supposed to be drawn truly from the anatomical table, are formed from the imagination of the painter merely; sturdy and active figures, with a ludicrous contrast of furious countenances, and active limbs, combined with ragged muscles, and naked bones, and dissected bowels, which they are busily employed in supporting, forsooth, or even demonstrating with their hands. This vitious practice of drawing from imagination merely is well exemplified in this, that anatomists have, with one consent, agreed to borrow the celebrated Torso for putting their bowels into, to explain them there; a practice which has descended from the time of Vesalius down to Chesselden, and from him to the systems of the present day.

No painter in natural history, in botany, in mechanics, nor in any thing that relates to science, would dare to draw without his subject immediately before him: but anatomists, who most of all need this clearness and truth, have been most of all arbitrary and loose in their methods; not representing what they saw, but what they themselves imagined, or what others chose to report to them:—hence the careless copying from book to book, the interpolations of anatomists, the interference of painters in a subject degrading to their higher art, the errors and mistakes of engravers, and the subjection of true anatomical drawing to the capricious interference of the artist, whose rule it has too often been to make all beautiful and smooth, leaving no harshness nor apparent blurr in all his work. Even the celebrated book of Albinus has been thus abused; and though he is sparing of cellular substance, and glands, and fat, and vessels; of all that gives a drawing its likeness to the human body; even the little that he had given, is now rounded down into the smoothness of ivory, as if a model had been made and drawn from. Albinus, (naturally sparing of ornament, and wanting in the natural character of parts) lived to see his drawings thus robbed of the little that they possessed of grace or nature; and then produced, as if in mere wantonness and sport, under the high title of Anatomy of Painting; but by one, who seems too grave to have intended any stroke of irony so refined as this.

A higher taste prevails in the present age; and the splendid and noble works of Morgagni, Haller, Bidloo, and Albinus, and of Chesselden, Hunter and Cowper, are drawn truly, and from nature, and cannot be forgotten, while anatomy, and the arts depending on it, continue to be esteemed. Yet even, among those great men, we have seen an idea gradually improving, till at last it was brought by Haller to the true point. For Albinus's drawings are merely plans: Bidloo's tables are beautiful and masterly; but being wanting in regularity and order, they want altogether the clearness of a plan; Haller's drawings are as fair as Bidloo's, as regular as those of Albinus; and combine in one the truth and sometimes the elegance of drawing, with the plainness and accuracy of a mere plan.

If an anatomist shall set up a skeleton, and draw it in postures resembling those of life; if he shall dissect the human body, studying and drawing it in parts; if he shall continue drawing muscle after muscle, and one part after another, till he have gone through the whole; if he shall proceed then to take these drawings and notes of individual parts, and lay them over his first drawings of the bones; if he shall try to match the parts belonging to fifty individual bodies of different sizes, of various forms, dying, some suddenly, and others slowly, some full and muscular, others emaciated and poor; what will the result of all this be, but a mere plan? It is a plan merely through all the process, and in all its parts; it cannot be other than a plan when the whole work is accomplished and set up. It was an unlucky theory of this kind that carried the great Albinus, for fifteen years, through a course of laborious dissections, painful and useless to himself; but useful to all those who have to follow him: Still each drawing of his is but a mere plan, resembling no individual body, resembling in nothing the general drawing of the body; it is such a view as never is to be seen in a dissection. It is not, like our Couper's nor like Bidloo's a true drawing of muscles dashed with touches of glands, and fat, and cellular substance, which are the natural distinctions of parts; nor mixed with the branchings of arteries or nerves, the chief objects for which we study the muscles; but it is like a statue anatomised, where all the irregularities of substance, all the gradations of bones, ligaments, tendons, and flesh, are rounded down with a studied smoothness; it is a figure which the student can never compare with the body as it lies before him for dissection; it is a figure suiting

more

more the eye of the painter than the eye of the anatomist; nor even pleasant to his eye, since it stands in attitudes, which no swelling of particular muscles seems to support.

In the other extreme is BIDLOO; for, in his plates, the master-hand of the painter prevails almost alone; while whole sheets of infinite labour serve only to explain the joinings of the clavicles, or perhaps the form of one trifling muscle or gland. The formal figures of ALBINUS are more desireable than these. But, in either book, we regret either extreme; in ALBINUS we think that we understand every muscle of the human body! but our knowledge hardly bears the test of dissection; the drawings and the subject never can be directly compared:—In BIDLOO, we have the very subject before us! the tables, the knives, the apparatus, down even to the flies that haunt the places of dissection, all are presented with the main object of the plate; and thus we have perfect confidence in the drawing; in which also the parts are laid out in a bold and masterly stile, so that the dead subject and the engraving can well bear to be compared. But in BIDLOO there is often no classification nor arrangement, no breadth of parts, by which we can understand a whole limb; a thigh is presented with no one marked point; neither the haunch nor the knee are seen: His plates are all elegance in respect of drawing; in respect of anatomy, they are all disorder and confusion; and one must be both anatomist and painter to guess what is meant, how the limb is laid, and what parts are seen.

It is to HALLER that we must give the palm; who having to do with parts chiefly, and not with a whole, has seldom offended by drawing a dissected body, after a living form; nor by planning and dividing a living form into the parts of a dissected body; but has given his drawings truly from the anatomical table; and with the truest drawing, has given, very often, all the distinctness of a plan.

Now we should always remember that anatomy is to be learnt only by dissection*; dissection is the first and last business of the student;

* If anatomy is to be acquired in this way only, then must we understand by a school of anatomy a school of dissection: Yet those who have had the happiness of prosecuting their studies in foreign universities, or in the London schools, will hardly believe it, that there is at least one place of education much celebrated, and worthy to be so, where the study of anatomy is denied or proscribed.—Where not only it is not praiseworthy, but even dan-

and when drawings are made for his use, the body should be laid out as he is to order it in dissection; the belly should be displayed as he can display it in his subjects; an arm should be so drawn, that, when he dissects the arm of the subject, it may fall naturally upon the table exactly as he finds it in his book; and still the posture of arms, and legs, and heads, should be preserved distinct and clear: enough of the general figure should be kept to explain the posture of parts; there should be kept up a natural correspondence among the several drawings, and while the true anatomical drawing is delivered upon one plate a plan, if it be required, should be added upon the next.

I know but too well that few will submit to learn anatomy, as they should do, by the dry reading of anatomical descriptions, and the tedious comparing of these with the subject, or with their plates; and there are very few, who have learned this useful truth, that they are to become acquainted with parts only by being masters of the whole. One proposes to himself to learn the bones only: another designs to attend chiefly to the joints; a third will study the arteries only, "for the arteries are of chief use to the surgeon; another delights in studying the viscera, and is sorely disappointed if he fail to understand the brain; while anatomy absolutely is not to be studied in parts, but is one fair and continued circle, where such is the correspondence, and mutual connection of all the parts, that he who would know the muscles, must first study the bones, and he who would learn the blood vessels, and nerves, (which are indeed the most important to the surgeon,) must know the muscles thoroughly. It is according to the muscles, that all the other parts are to be described; for when we trace the course of a blood vessel, it is by pursuing its intricate wanderings among the muscles: it gives its first

gerous to propose dissections; where the man who may be so bold as to do his duty in that most important study, shall be traduced in filthy pamphlets, thrust officiously, and with intentions not of the purest kind, into the hands of every young man who comes to school. If I have felt this, it has been still in silence; till I now speak of it, not formally, but by chance; not with the mean thought of presenting myself as a persecuted man, nor of indulging a resentment which were lost upon such people, or upon such an occasion; but to make my acknowlegements to one, whose generous conduct is not unknown; who is truly interested in the honour and reputation of that university to which he belongs; who is at once an honour and defence to it; and whose single praise, (may I be allowed to say what touches myself so nearly,) "shall outweigh a whole theatre of others."

branch

branch to one muscle, its second branch to another; it forks into two, under the belly of a third; it goes through the substance of a fourth muscle, or accompanies its tendon, or runs along the edge of its fleshy belly. So that in describing a great vessel, we mark its exit from the trunk of the body, its entrance into the arm-pit or groin, its course down the arm or thigh; the dangers, the wounds, the operations of each great artery or nerve, are recorded according to the parts which their several branches supply. And besides these considerations, which cannot but have their weight, we must not forget, that the wounds of the muscles, the sprains of tendons, the rupture of ligaments, the collections under the general fasciæ or broad tendons of the limbs, are of themselves sufficient and direct motives; the only ones, indeed, that need be assigned for teaching the anatomy of the muscles with particular care.

Yet, labour it as we will, how poorly ought we to think of our own diligence, when we find Statuaries or Painters studying the anatomy of the human body, with a perseverance and success which may well put us to shame! Painters merely, who having no object so important, nor so interesting, as the injuries and accidents of the body, desire nothing more than to understand its external beauty and its form.

The Greeks lived in the most delightful countries of the world; the most beautiful people; sometimes happy, and always free. Among them the arts grew and flourished, and were to all ranks the chief business and pleasure of life:—for moderation and simplicity was in their dwellings, while all their riches were reserved for shows and festivals, for adorning their native city, for the public use. Their temples and streets and halls were filled with representations of a beauty, which never existed but among that happy people, or lives now only in their works the admiration and reproach of our laggard times.—They saw in their public games, the lovely forms of their youth moving in dignity and grace: For there were seen in mixed assembly;—in their women, the purest models of female beauty;—in their young men, the grandest displays of the manly form; moving and in action; inspired by every noble emulation, exulting in their strength; or advancing into the public view, only to show the beauties of their form.——Their artists needed

no helps of anatomy; but in those delightful spectacles collected all the modes and forms of beauty, to combine them into one high ideal form.*

The moderns have come poorly after, in this great career; copying coldly those half-animated forms, which are seen in our schools of the arts fixed in laborious postures, "selling their ignoble beauty for a price." Sensible of this great defect, our artists have taken the help of anatomy to correct this tame unmeaning form; studying with a noble perseverance, (but as their own critics acknowledged to us,) with but poor success. They study each muscle; they note down its direction and use; they guess at its office and power in certain postures of the body; and try to mark it in its just place. The modern statuary, is like one wandering among the ruins of some noble city, who finding the remains of a temple, traces its lines among the ruins, and, upon this slender knowledge, tries to imagine and coldly represent to us its lost form and antient grandeur.

It was thus that Michael Angelo studied our profession: and studied it so, that the lessons of that great master are a reproach to those who profess anatomical knowledge. His knowledge of anatomy gave to all his works a cast "approaching more nearly to the Etruscan style than to the purer taste of the Greeks;" marking them too harshly with traits of learning. His violent distortions and sudden shortenings of the limbs are less pleasing to those who delight in the delicate and higher beauty; fitting him less for representing the female form, than for giving bold and terrible pictures of action and strength. But still he is correct and true in all that belongs to the anatomy of the human body; and his studies are a trial of the anatomist's skill;—for in looking upon one of these, we find that the knee, the ancle, the neck, the wrist, each head and projecting point of bone, is truly marked; while the distortion of the figure, the violent action of the limbs, the shortenings and bending of the joints and the intricacy of the whole posture are difficult in the extreme; but still each limb is true, and every individual muscle swelling in its just degree, so as to preserve correctly the proportions and balance of the whole. Should not we be ashamed to compare our languid endeavours with

* "We are taught by philosophy, the natural pre-eminence and high rank of specific ideas "above individual forms."——HARRIS.

the perfect knowledge of this great painter, the very notes of whose deeper studies in anatomy we are unable to read?

But in our profession, though the very science might almost be defined a knowledge of parts, industry and knowledge are but of low repute, and the very name of diligence and mere labour, a term of reproach; while genius is in truth nothing but a strong desire of knowledge, and the spirit of industry its truest mark. Let not the student of anatomy despise labour, nor hope to acquire his knowledge by other means. In justice to his own genius, he must take all advantage of descriptions, and drawings, and dissections, and plans; feeling, no doubt, in his first difficulties the need of every help, but striving to mount, by slow degrees, from such elementary books, as that which I now present him with, to those noble and splendid works, which were the beginning of correct anatomy, and will not be forgotten, while that branch of knowledge is respected or known. And here may I not complain, that, in scheming these plates, I am curbed and bound in by the œconomy of my plan? If, indeed, by wishing merely, the thing could be accomplished, this word œconomy should never more be heard of in all that relates to science; but many are to study our profession who cannot command those noble works; and every young man who is to study an art in which the interests of society are so immediate and so strong, should have the means of instruction put within his reach. If there be any teacher, then, who being circumscribed in point of time, would consent to offer his help and instructions in that form in which he could give them, regarding more his duty than his good name, to him this motive shall be my apology; it shall be my apology to all those who can feel with me a sincere desire to do good and to be useful;—but not to all!—for students have been already warned, that they must be jealous of those who pretend to give them plates; "that some are capable of making plates for them, and some are not; that those who are best able to give them plates, either will not undertake the labour, or cannot find time." And so, the half only of this delicate argument was left unpronounced, which was already but too plain. Now although some unfortunate publisher of Anatomical Drawings was thus left impaled upon the horn of this broken dilemma, any implied reproach could not be aimed at me particularly, since my book was not published; it was only advertised. This is perhaps a

sort

sort of caution, which it might in certain circumstances be very right, or very dutiful, or very convenient, perhaps, to give; as young men, no doubt, need some careful person to instruct and help their judgements, especially in such tender points as this is. But should it ever happen, that a man of high rank and character should be found, striving to hurt any poor endeavours of mine, I might feel that rising within me, which it were almost a meanness to suppress*; and reply to him in the words of Lord Shaftsbury: "You, Sir, have a character, which sets you above us far, "and releases you from those decorums, and constraining measures of be-"haviour, to which we of an inferior sort are bound; you may liberally "deal out your compliments and salutations in what language you think "fit; for I shall but strive with myself to suppress whatever vanity might "naturally arise in me for such a favour bestowed; for, whatever may in "the bottom be intended by such treatment, it is impossible for me to "term it other than a favour, since there are certain enmities which it "will ever be esteemed an honour to have deserved†."

The author surely will not be accused of such want of taste, and relish for elegant drawing or engraving, as to hold these plates out as excelling

* Ille sapit, qui te sic utitur, omnia ferre
Si potes ac debes. JUVENAL.

† Perhaps it was some such critic as this that contrived that great anatomical drawing, which either I should not have mentioned at all, or should have given some short account of.—Indeed it is not easy to deliver a fair history of even the most trivial improvement, and very seldom are we able to discover by what happy chance an idea first sprang up in the mind of its author; but perhaps the history of this grand figure might go in the following terms. The ingenious Mr. Cruikshanks, with the design of explaining all that he or Dr. Hunter had injected, of the lymphatic system, in one consistent view, took a delicate and elegant drawing of the human body, and laid his lymphatics upon it, explaining at the same time his intention, and making his apologies for this little plan; but he could not foresee that the idea thus first suggested was to receive, in passing through a greater mind, a grander form.—The expedient was tried again, and the second anatomist resolving to outdo at one stroke all his rivals, and knowing of no surer way than this, had an engraving made of a most gigantic size! An Askapart! A figure of full six feet in height; which (bating the clumsiness of conception) has turned out to be a drawing of such singular beauty, that it will not be rivalled; and as there can be no representation of the human body of more than 6 feet high, it positively cannot be excelled.—All those who understand the intention and effect of engraving, or who have any idea of the bold and free manner which class drawings require, must wonder even at the report of such a thing; but not as our poet Young wonders, "for wonder is involuntary praise;" if the emotion be involuntary, it will most likely be of another kind.

in what is beautiful; yet, may he not hope, that they are not wanting in what is useful? They want that size which gives splendor to a grander work, and of course that proportion, which gives the full idea of the human body; they want that elegant drawing, and careful engraving, which should do any idea justice, which is so necessary in delivering the minuter parts with character and truth; all is wanting that belongs to the idea of a grander work; an idea, which the author could not but feel, yet durst not indulge. But still he hopes they may be found simple, intelligible, and plain; having whatever belongs to a little system of plates, intended merely to accompany a book of anatomy, and chiefly designed for those who are entering on their studies, and but little advanced; and he trusts that he will be indulged, in trying fairly, whether by attending to the correspondence of ideas and representations, whether by ordering his drawings so as to suit his book, whether by a careful combination of descriptions, drawings, and plans, he shall not be able to deliver a system of anatomy, intelligible, or perhaps easy for his pupils; enabling them to enter the dissecting room with confidence, and to leave it, not without instruction; and qualifying them also for understanding those illustrations, which he shall continue to give, or the corrections and remarks of other teachers; —for that student has but a mean idea of the value of his profession, who does not seek all means of instruction; and the teacher must have a poor conceit of his present knowledge, who does not hope, by his own diligence, to correct himself; or to receive lessons from others, sometimes friendly, too often, in this world tinctured with its enmities and passions; such as are not pleasant in receiving, which still it is a duty to receive.

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WHILE I have ventured to speak so fully concerning the general design of these plates, it is very natural for me to say also a few words concerning the mechanical labour.

I have drawn my plates with my own hand. I have engraved some of these plates, and etched almost the whole of them: Which I mention only to show, that they have their chance of being correct in the anatomy, and that whatever, by my interference, they may have lost in elegance, they have gained, I hope, in truth and accuracy.—And while I mention this, I must

must not be ungrateful to Mr. Beugo, whose skill will, I hope, be shown on some higher occasion, and whose character must not be hurt by any thing that may be seen here; for wherever in these plates all is fair and clean, it is owing to his care; and those blots of execution which are not fairly covered, have not come through his correcting hand.—Whatever he has done alone has been hurried, allowing no time for artful or laborious engraving, though still all that is here, I hope is correct and true.

I have endeavoured, also, to keep the explanation of these plates to the most simple and natural form; knowing, by long experience, that anatomical descriptions are, even to the most earnest and diligent student, very tedious and hard to be understood. The loading of such a study as Anatomy with peculiar or affected language, and with needless terms of art, where too many are really needful, has a tawdry and vulgar appearance, of which we have much reason to be ashamed; it is a barbarous jargon, to which our ear is subdued only by long and inveterate custom: and our continual use of this trashy language in school books, presents to the student the difficult and harassing task of learning at once a new science and a strange language.

Swift, who commends simplicity of language, and enforces his lesson by the most beautiful examples, says, "When the water is clear you will "easily see to the bottom;" but anatomists have stirred up their technical terms so thick, that the student has but a poor chance of seeing to the bottom, unless we shall agree in letting this sediment quietly subside again.

The medical student is, indeed, so accustomed to hard words, that he can scarcely think any book accurate or complete that is without them; and however well he may understand its descriptions, cannot believe them true. He is not only accustomed to know the most difficult parts by the hardest names, but to have the detail given to him in such expletives, as the Posterior, Anterior, Superior, Inferior*; and often after all, this Superior Anterior portion is but one extremity forsooth, or one portion of a part, which having other posterior extremities, or anterior portions, has to pass still

* Our science in this country has got this vile farrago, of Anterior, Superior, &c. through bad translations of Latin and French, where such words as *Superieure* or *Superior* are in their place.

through

through a long declension of these curious terms, which have not, like the terms in any other science, the property of conveying more regular and clear ideas, nor of saving superfluous words. They stand in place of the simple expression of upper or lower ends.—Now this clutter of hard names confounds the ear, as well as puzzles the judgment of the student, and is truely a disgrace to the science;—it looks as if we believed Anatomy to consist in strange terms, and that we could not write in true character of Anatomists, but by departing as widely as possible from the language of gentlemen. I have ventured, instead of "setting up this rank "and file of tall opaque words betwixt the reader's imagination, and my "own conceptions," to make every description as simple as may be,—using no hard words, but the pure names; choosing rather that my book should be plainly understood, than admired as a piece of unintelligible profound anatomy.

THE

# FIRST BOOK

OF THE

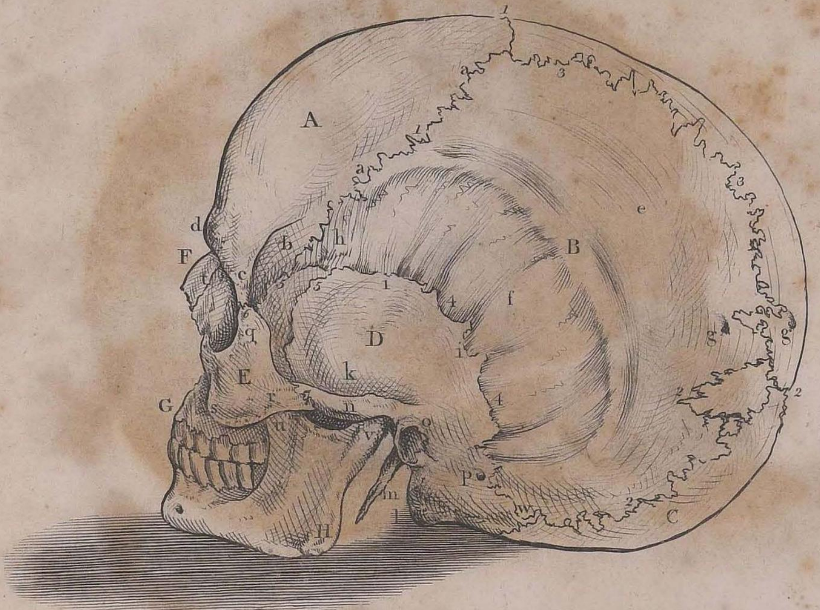
# BONES.

I

II

Published for Longman & Rees, 1804

I




II.

Engraved by J Bell

Published for Longman & Rees 1804.

# BOOK FIRST.

## OF THE

# BONES.

## PLATE I.

*This Plate explains Chap. II. of the Text Book.*

IN this Plate are represented the Adult and Fœtal Sculls, that they may be compared with each other;——and there is explained here, not the minute anatomy of the individual parts, but the general view only, viz. the Bones of which the Cranium is composed;——the Sutures by which the several bones are joined. And, in the Fœtal Scull, the form and process of Ossification; and the interstices called Fontanelles, which are always left membraneous, during the slow ossification of the child's head.

### FIGURE I.

### THE ADULT SCULL.

A. THE FRONTAL BONE, where (*a*) shows the serrated edge which forms the Coronal Suture;——(*b*) the flatter part behind the Eye, which is plain and hollow for lodging the Temporal Muscle;——(*c*) is the acute angle of the bone, which is called the External Angular Process, from its forming the outer angle or corner of the eye; the ridge which runs up from this is the temporal ridge of

the Frontal Bone;——(*d*) is that prominence over the nose, under which there is a small cavity within the bone, called the Frontal Sinus, which the surgeon avoids in performing the operation of trepan; though it is rather from the difficulty of perforating this part that he shuns it, than from any danger in the perforation.

B The PARIETAL BONE. The letter B points to that great line, which running according to the length of the bone, with a rain-bow like arch, divides the surface into two equal parts, of which the upper and smooth-part (*e*) is covered with the thin expanded tendon of the OCCIPITO FRONTALIS MUSCLE, while the lower part (*f*) has its surface radiated; and these radii are the impressions of the particular bundles of which the Temporal Muscle consists; so that "the white "semicircular line (B) represents the origin of the temporal muscle; and the "converging lines on the surface (*f*) express the manner, in which the fibres of "the muscle are gathered into a smaller compass to pass under the jugum."—(*g*) points to a small hole in the back part of this bone, which is sometimes large, sometimes wanting; and which gives passage to a small vein of the integuments, (going inwards to the longitudinal sinus or great vein of the head) and also to a small artery, which accompanies the vein: (*h*) marks the temporal angle, or that corner which, running down sharp and long into the temple, is often called the Spinous Process of the Parietal Bone; and this corner is the more to be observed, that it is under it that the great artery of the Dura Mater runs.

C The OCCIPITAL BONE, of which but a very small part is seen in this direction.

D Is the TEMPORAL BONE, seen full and direct from one side; where (*i*) marks that thin upper edge, which forms the squamous suture; (*k*) the deep and flat part of the bone, on which the temporal muscle lies; (*l*) the Mastoid or Mamillary Process, named from its resemblance to a nipple; (*m*) the Styloid Process, which projects down towards the back part of the throat to give origin to several muscles of the throat and tongue; (*n*) is the Zygomatic Process, which, joining with a similar process of the cheek bone, forms the zygoma or arch; (*o*) marks the Ring of the Meatus Auditorius Externus, or outward ring of the ear; and (*p*) shows a small hole (mastoidean foramen) which, like that of the parietal bone, transmits a vein passing from without into the great sinus or vein within the scull, and which belongs sometimes to the temporal, sometimes to the occipital bone, or sometimes is in the suture betwixt them.

E The OS MALÆ, or bone of the cheek, which forms the lower and fore part of the socket for the eye, and supports the cheek; and by its prominence or flatness gives the form of the face;——one process (*q*) is seen here going up to meet the angular process of the frontal bone, and so is named the Angular Process

Process of the Cheek Bone; while (*r*) another process, called the Zygomatic Process of the Cheek Bone, goes to meet the zygomatic process of the temporal bone, forming the complete jugum, or yoke, under which the temporal muscle passes; and from that prominent part of the cheek bone, which is marked (*s*) there go two remarkable muscles, one the Masseter or Grinding Muscle, which passes from this part of the cheek bone into the angle of the lower jaw to pull it upwards; while another, a very slender and delicate muscle, goes from the same point inwards towards the angle of the mouth, and is called Zygomaticus, or Distortor Oris.

F Points to the small bones of the Nose, named NASAL BONES; for there are two of them forming the root of the nose, and the left one is seen here; the small letter (*t*) points to what is called the Lateral Nasal Suture, which stretches to the upright process of the upper jaw bone.

G Points to the UPPER JAW BONE, of which scarcely any thing is seen in this view, except the circle called the Alveolar or Socket Process, in which the teeth are set.

H Marks the LOWER JAW BONE; and the letter is placed upon that point of the Bone which is called the Angle, into which the Masseter Muscle is fixed;——(*u*) marks that process of the jaw which is called Coronoid or Horn-like, which goes up under the Zygoma to receive the great temporal muscle as it passes under the arch;—and (*v*) is the Condyloid Process, or that branch of the lower jaw bone, which is crowned with the condyle or head, forming the joint or hinge upon which the jaw moves; which head of the jaw bone is felt by putting the finger before the flap of the ear, and moving the lower jaw.

THE SUTURES ARE,

1. The CORONAL SUTURE, running across the head, joining the frontal to the parietal bones, extending from ear to ear; and going down into the Temple, where it joins the Squamous Suture, and here in the Temple the extremity of the suture wants the indentations of a regular suture.
2. The LAMBDOIDAL SUTURE, joining the occipital to the parietal bones; striding over the Occiput, resembling the Greek letter Λ (Lambda)—But the resemblance is a little hurt by the accident of an Os Wormianum, or irregular bone, such as is found more frequently in this suture than in any other; sometimes single, as in the scull from which this was drawn; but sometimes in great numbers, and not unfrequently of the size of a crown piece; these Ossa Wormiana may displace the Lambdoidal Suture so, that being out of the usual direction, it may be mistaken for a fracture. Sometimes there is a transverse suture dividing the occipital bone.

 3. The

3. The SAGITTAL SUTURE, joining the parietal bones to each other; extending from the Lambdoidal to the Coronal Suture, as an arrow lies betwixt the string and the bow.

4. The TEMPORAL OR SQUAMOUS SUTURE, belonging chiefly to the temporal bone; and called squamous or scaled, because the edges of the temporal and parietal bones are there extremely thin, and are laid over each other like the scales of armour. One part marked (*w*) lying betwixt the occipital and parietal bones, is named the Additamentum Suturæ Squamosæ, or supplement of the Squamous Suture.

5. Marks a part of the SPHÆNOIDAL SUTURE, joining the wing of the Sphœnoid Bone, to the temporal, frontal, and parietal bones, for, in this hollow under the zygoma, all these bones meet by thin scaled edges, and lap over each other; so that all the sutures in the Temple are squamous.

6. The TRANSVERSE SUTURE, is one which runs across the face, through the middle of the orbits, and over the root of the nose, and the end of it appears here, joining the angular processes of the frontal bone, and of the cheek bone.

7. The ZYGOMATIC SUTURE.

## FIGURE II.

### THE FŒTAL SCULL.

EXPLAINS the FŒTAL SCULL;——where we find the holes, processes, and other marks, very imperfect: Of course a shorter and more simple explanation will serve.

A Is The FRONTAL BONE; and the letter is so placed, as to mark the central point, where the ossification begins; the ossification being more perfect at this point, and going in a radiated form towards all the edges of the bone, leaves the ossification very imperfect all round the edge of the bone; and at (*d*) there is a difference betwixt this and the Adult Scull, for here the cavity of the Frontal Sinus is not yet formed.

B The PARIETAL BONE; where also the letter marks the centre of ossification; the radii are very plain; and the edges are seen imperfect and membraneous, leaving all the sutures imperfect. The ridge, which divides the bone, is not yet formed; for the Temporal Muscle has not yet begun to mark the bone.

C The OCCIPITAL BONE: where the letter again in this bone, points to an ossifying central point.

D The

D The TEMPORAL BONE; where many parts, marked in the Adult Scull, as the Styloid and Mastoid processes,—the small hole,—and the marks of the Temporal Muscle, are all wanting. And the ring (*o*) of the Meatus Auditorius Externus, is merely a ring; is fixed to the bone only, and not joined with it; and is here seen covered with the smooth Membrane of the Tympanum, or Drum of the Ear.

E The CHEEK BONE; which like all the other bones, is very round, and its edges blunt and ill defined.

F The SMALL BONES of the Nose.

G The UPPER JAW BONE; where, since the teeth are not yet come up, the Alveolar or Socket Process is not formed, nor even marked.

H The LOWER JAW BONE; where also the Alveolar Process is wanting, and where the branch of the jaw bone does not rise from the basis, or lower line, with a bold and acute angle, but goes obliquely off, more horizontal, and more in the same direction with the rest of the bone.

And lastly, the chief point to be observed, in the scull of a child, is the openings of the head; for the parietal bone is so incomplete round all its edges, that it leaves all the sutures imperfect and membraneous, and leaves some openings particularly large. (*a a a a*) mark the four corners of the greater opening upon the top of the head; which, from the hypothesis of its serving as a drain, is called the Fontanelle, or Fountain of Moisture. It has four angles, is formed by four crossing sutures; the Sagittal Suture, descending quite to the nose. The Fontanelle is covered only with a thin and delicate membrane; it is named the Greater, Anterior, or True Fontanelle, the opening of the head.

(*b*) Marks a less opening, which is formed by the meeting of the Lambdoidal and Sagittal Sutures; but, as they do not cross, there are here but three converging lines; three angles or points of bone; no perceptible opening, but the bones rather lapping over each other. It is over this point that the hair turns in a sort of vortex, if we may be allowed to explain it so; and though the greater Fontanelle was thought to present in labour, this back Fontanelle is the true presenting point.

(*c*) Marks a small Fontanelle, or membraneous interstice before the ear; and

(*d*) Marks another small Fontanelle behind the ear, in the place of the Additamentum Suturæ Squamosæ; and it is the more to be remarked, as it is through this little Fontanelle, that the accoucheur opens the head in the rare coincidence of preternatural posture of the child, and deformed Pelvis; where after delivering the body, it is impossible to get the head out: and he prefers this opening, and shuns the back Fontanelle, lest, in piercing there, he should cut the ligament of the neck, and so lose his hold of the head.

PLATE II.

## PLATE II.

*This Plate explains Chap. III. of the Text Book.*

EXPLAINS the individual bones of the CRANIUM, the FRONTAL, PARIETAL, and OCCIPITAL BONES.

### FIGURES I, AND II.

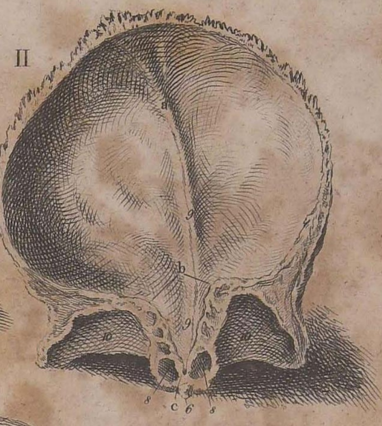
EXPLAIN the OS FRONTIS, or bone of the forehead. The numbers apply equally to either figure; and every number wanting in the first figure, must be sought for in the second.

1. The SUPERCILIARY RIDGES, on which the eye brows are placed, and which are formed by the frontal sinuses. The skin is very loosely attached to the bone, all along this ridge. The many small dots, which are seen all along this ridge, are the marks of many little arteries, entering here to nourish the bone.
2. Points to that hole which is called the SUPERCILIARY HOLE, or Supra orbital hole: It permits the small Superciliary Artery (a branch of the ophthalmic artery) and a division of the ophthalmic branch of the fifth pair of Nerves to come out from the socket of the eye; they turn upwards upon the forehead, where they take the names of Frontal Artery and Nerve. On the one side it is a fair round hole, on the other side it is a notch only.
3. The two INTERNAL ANGULAR PROCESSES.
4. The two EXTERNAL ANGULAR PROCESSES. The *temporal spine* is continued upwards from the External Angular process.
5. The Hollow behind the External Angular Process, in which the Temporal Muscle lies.

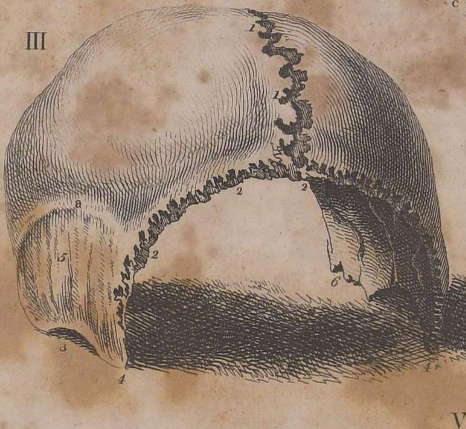
6. The

I

II



III



IV

V

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I. Beugo sculp.

THE TANJORE MAHARAJA SERFOJI'S SARASWATI MAHAL.

6. The Nasal Process; standing up sharp and rough, betwixt the two internal angular processes.
7. The Bump, at the inner end of the Superciliary Ridge, marking the place of the Frontal Sinus, and indicating also the size of that cavity, by the degree of rising.
8. (Fig.) II. The Mouth of the Frontal Sinus; where it opens into the Nose.
9. —is to be found on Figure II. only, and marks the Internal Spine, or Ridge to which the Falx, or perpendicular partition of the Dura Mater is fixed; the ridge very generally terminates in a groove—
10. The two Orbitary Plates; which are those two thin parts of the bone, which extend over the eye, so as to form the roof for the eye, and the floor for the fore lobes of the brain; and it is by the continual pressure betwixt these two parts, that the Orbitary Processes become so extremely thin, that they are quite transparent.

(*b*) Marks the space or distance betwixt the two Orbitary Processes; viz. Cessura Œthmoidea which space is occupied by the Œthmoid Bone, which thus lies over the root of the Nose.

11. The mark of the Cartilaginous pully, through which the tendon of the Obliquus Oculi runs; and a little deeper, were it not for the darkness of the shade, we ought to see the Foramen orbitale internum.
12. Is the Superficial hollow for lodging the Lachrymal Gland in the upper part of the Orbit.

(*c*) (Upon Figure II.) shows the blind hole where the Falx begins. This blind hole sometimes belongs to the Frontal Bone, sometimes to the Œthmoidal Bone, but lies most commonly in the middle, betwixt the Œthmoid and Frontal Bones.

## FIGURE III.

Shows the two Ossa Parietalia, or Parietal Bones, separated from the other bones of the Cranium, and also parted a little from each other, so as to show that serrated edge, which forms the Sagittal Suture.

1. Shows the serrated edges, forming the Sagittal Suture.
2. The edge of both bones, which, in a semicircular form, produce by their union with the Frontal Bone, the Coronal Suture.

3. The

3. The thin semicircular edges, to which the Temporal Bones are joined, forming the Temporal or SQUAMOUS SUTURE.
4. The SPINOUS PROCESS, or TEMPORAL ANGLE; or largest and most pointed corner of the Parietal Bone.
5. The RADIATED SURFACE, upon which the great Temporal Muscle lies; (*a*) marking that ridge of the bone, which divides it into two parts, and beyond which the origin of the Temporal Muscle does not extend.
6. The impression of the Artery of the Dura Mater first.

*N. B.* The only hole, which belongs to the Parietal Bone, cannot be seen in this view, but is to be found in the first plate.

## FIGURES IV, AND V.

EXPLAINS the Os OCCIPITIS. It is here shown in two opposite points of view, from within, and from without; the letters and figures apply to either figure; and the fourth figure naturally takes the lead, as the description of the Occipital Bone, always begins with the external surface.

FIGURE IV. The outer surface.

1. The UPPER TRANSVERSE SPINE, formed for the implantation of the Trapezius and Complexus; or produced, according to some, by the action of these great muscles.
2. The SMALLER and LOWER SPINE, formed by the Recti Muscles:—small muscles which come up from the first Vertebra to lay hold on the Occiput.
3. The PERPENDICULAR SPINE, which divides the muscles of the opposite sides from each other; and by this crossing, these two spines are named, in general terms, the Crucial Spines.
4. The Great TUBEROSITY, sometimes called the Spinous Process of the Occipital Bone. (*a*) The Cuneiform Process, which meets the Os Sphænoides. (*b*) The Condyle, or Joint Process, on which the head moves, at least in the nodding motion. (*c*) The Foramen Magnum, through which the spinal marrow passes out from the scull. (*d*) The Condyloid foramen being a Hole for the 9th, or Lingual, Nerve. (*e*) The smaller Hole behind the Condyle, for the passage, not of any nerve, but of a cervical vein, going in towards the Great Lateral Sinus.

In FIGURE V. is explained the inner surface of the Occipital Bone; and the figures are continued, that the description may go on still in the same order.

5. Is the ridge to which the Tentorium, or membrane which supports the brain, and defends the Cerebellum, is fixed.

6. The

6. The two furrows, in which lie the Right and Left Lateral Sinuses, making this broad groove.

7. The Fossa Cerebri, two hollows for lodging the backmost lobes of the brain, above the place of the Tentorium or supporting membrane.

8. The Fossa Cerebelli, two similar hollows, for lodging the two lobes of the Cerebellum.

9. Internal middle ridge or spine to which a small falx or process of the Dura Mater is attached; which is like the great one, and like it contains a small sinus or vein in it, the groove of which small sinus is easily seen here.

(*a*) The Cuneiform Process. (*c*) The Foramen Magnum. (*d*) The hole for the ninth pair of Nerves. (*f*) The hollow or thimble-like cavity, in which the end of the Lateral Sinus lies; for at this point the sinus turns suddenly round, escapes from the scull, and getting down into the neck, loses the name of Sinus, and takes that of Internal Jugular Vein.

(*g*) There was left sticking to the end of this bone a fragment of the Sphœnoid bone, so that at this point the Cuneiform processes of the Occipital and Sphœnoid bones are so united, that to separate them (in the adult at least), we must break them; and in breaking these bones, the great cell of the Sphœnoid bone, or part of it, stuck to the Cuneiform process of the Occipital bone; and this cell is marked (*g*).

## PLATE III.

*This Plate explains the latter part of Chap. III.*

EXPLAINS much of the difficult Anatomy of the Scull; for these bones the TEMPORAL, ŒTHMOID, SPHŒNOID, and UPPER JAW BONES, have many curious and intricate parts.

### FIGURES I. AND II.

EXPLAIN the TEMPORAL BONE; and now again the letters and numbers belong in common to both figures; to Figure I. which explains all the parts that are upon the outside of the Temporal Bone, and also to Figure II. which explains all that side of the Temporal Bone which is towards the brain.

The GREAT DIVISIONS of the Temporal Bone, are; (*a*) The squamous, or thinner part, forming the Squamous or Scaley Suture. (*b*) Fig. II. The Pars Petrosa, or Rocky Part, which is, indeed, in the child, a distinct bone. (*c*) Fig. I. The Occipital Angle, or Mastoidean Angle, being that corner of the bone, which is joined to the Os Occipitis, by the Additamentum Suturæ Squamosæ.

THE PROCESSES OF THE TEMPORAL BONE ARE,

1. The ZYGOMATIC PROCESS, stretching forwards to meet that of the cheek bone.
2. The STYLOID PROCESS, standing downwards over the throat, to give origin to many of the muscles of the throat.
3. The VAGINAL PROCESS, which is a kind of rough rising at the root of the Styloid Process.
4. The MASTOID or MAMILLARY PROCESS, which is not formed in the child; which consists of cells; it is felt immediately behind the ear; its cells belong to the Ear, and it has been proposed to open them in certain kinds of deafness.
5. The AUDITORY PROCESS, which is named a process, because it is in the child a distinct part, and still is in the adult (as represented here) a prominent ring.

The

Etched by J Bell

Published for Longman & Rees. 1804.

The HOLES of the TEMPORAL BONE relate chiefly to the EAR.

1. (*d*) Marks the MEATUS AUDITORIUS EXTERNUS, the outer Auditory hole, upon upon which the drum of the ear is braced down.

2. (*e*) The Internal Auditory Hole, or MEATUS AUDITORIUS INTERNUS, by which the Auditory Nerve has access to the Ear.

3. (*f*) The Videan Foramen; a small hole for admitting a delicate thread-like nerve, which returns from without into the Cranium again, and joins the Portio Dura, or firm part of the Auditory Nerve while it is going along the passages within the Ear.

4. (*g*) The STYLO-MASTOID HOLE; which has its name, from its being at the root of the Styloid and Mastoid processes; it gives passage to the Portio Dura, or that small hard Nerve, which accompanying the Auditory Nerve, goes along with it into the passage of the Ear; but, while the Portio Mollis, or proper Auditory Nerve remains within the Ear, this Portio Dura, a distinct Nerve, and destined for the Face, comes out by the STYLO-MASTOID HOLE, under the Ear, and spreads upon the Cheek.

5. (*h*) Marks the ragged end of the Petrous Portion. The bony part of that canal, named the EUSTACHIAN TUBE ends here; but the Tube is chiefly Cartilaginous; and therefore in this the dried Bone, its openings appear quite irregular and rough; and when the student looks for the Eustachian Tube, he finds nothing but confused and ragged openings. The mouth of the Eustachian Tube, as it appears when dried, is seen in its right place, *Vid. Pl.* VI.

6. (*i*) The hole for the CAROTID ARTERY is also to be looked for at this point, though it cannot be seen in this particular view, unless the end of the Petrous Portion were turned more directly towards the eye.

(*k*) Is the Great FURROW, the Sigmoid Fossa, which the Lateral Sinus, or great Internal Vein makes, forming a thimble-like cavity at (*l*), by the last sudden turn which it makes before leaving the scull.

(*m*) Is a very small FURROW, formed by a small Sinus, or Vein, which goes along the ridge of the Petrous Portion.

7. (*n*) Is the last or 7th hole of the Temporal Bone. This is the small hole, formerly mentioned for the passage of a trifling Vein from without into the Lateral Sinus.

*N. B.* The joint or Condyle of the Lower Jaw is set in the hollow (*o*) just under the root of the Zygomatic Process.

## FIGURES III, AND IV.

EXPLAIN the ŒTHMOID BONE; FIGURE III. showing chiefly the upper surface of the bone, which supports the fore part of the Brain, and which is marked by the Crista Galli (*b*); and Figure IV. shows that confused surface, which hangs over the root or upper part of the Nose, and whose spongy bones (*dd*) form a part of the Organ of Smell.

(*a*) The CRIBRIFORM PLATE is the centre, as it were, of this bone, to which all the other parts are referred; this plate is perforated by the Olfactory Nerve, and a branch of the ophthalmic division of the fifth Nerve. It is from this horizontal and perforated plate, that the whole bone has its name.

The parts belonging to the Œthmoid Bone are,

1. (*b*) The Superior Perpendicular Process, which stands up from the Cribriform Plate, towards the brain; and is named CRISTA GALLI.
2. (*c*) The NASAL PLATE; which forms the Septum or partition of the Nose standing perpendicularly downwards and forwards, as the Crista Galli stands upwards: the Crista Galli and the Nasal Plate, are exactly opposite to each other.
3. (*dd*) The two upper Spongy Bones; they are named spongy, from their constitution, for they consist of cells; they are called Ossa Spongiosa Superiora, to distinguish them from two similar bones, which hang in the lower part of the Nose. They are spoken of as distinct bones, while they are but parts of the Œthmoid Bone.
4. (*e*) The ORBITARY PLATE of the Œthmoid Bone; which, as it is inclosed among the other bones of the Orbit, seems to be a distinct bone surrounded by a peculiar suture, and so is named the Os Planum; though it is merely the flat side of the Œthmoid Bone.
5. (*f*) Marks the place where the Os UNGUIS should be seen; but it is pulled away to shew the numerous cells of the Œthmoid Bone. These cells are divided into two sets, one set attached to the Orbitary Plate, or flat square side of the Œthmoid Bone; the other set to the Spongy Bone.
6. (*g*) FIGURE IV. shows that set of the cells, which more particularly belongs to the Spongy Bone, and (*h*) FIGURE III. shows the cells opened from above, to give a view of those, which more particularly belong to the Orbitary Plate.

Whatever farther, is necessary to the demonstration of the Œthmoid Bone, is to be found in Plates V. and VI. where the cells are particularly well explained.

FIGURES

## FIGURES V. AND VI.

EXPLAIN the SPHŒNOID (WEDGE-LIKE BONE;) or PTEREGOID BONE; it is named Pteregoid from its processes being like the wings of a bat, and is so presented here, as to suggest the likeness. Figure V. shows the back view of the bone, *viz.* that which is turned towards the scull;—Figure VI. shows the front view, *viz.* that which is connected with the bones of the face.

### ITS PROCESSES ARE,

1. The great ALÆ, or wings, commonly named the Temporal Processes, for they lie in the Temples; the Temporal Muscles lie upon them; and their upper edge is squamous like the edge of the Temporal Bone, and forms part of the Squamous Suture.
2. Marks that smooth surface of this TEMPORAL PROCESS, which, being turned towards the eye, enters into the Orbit, and is named the ORBITARY Process of the Sphœnoid Bone; so that the great lateral processes have a cerebral, a temporal, and orbitary surface.
3. The small and sharp SPINOUS PROCESS.
4. The hook-like point of the Spinous Process, which is often named the Styloid Process.
5. The External PTEREGOID PROCESSES; which are two flat and broad plates.
6. The two Internal PTEREGOID PROCESSES; which stand off a little higher, and more direct from the body of the bone; they are smaller; and terminate in a little hook. The Pteregoid Muscles, which go to the lower Jaw, arise from the processes themselves; and the TENSOR PALATI MUSCLE turns round this little hook.
7. The AZYGOUS, or single Process; which is single, because it stands out from the middle of the bone. It forms part of the partition for the Nose, and is thence named NASAL PROCESS.
8. The two ANTERIOR CLYNOID PROCESSES.
9. The two POSTERIOR CLYNOID PROCESSES.
10. The space bounded by these four CLYNOID PROCESSES; which, from resembling a Turkish saddle, is named SELLA TURCICA.
11. The two little wings of Ingrasias, called the TRANSVERSE SPINOUS PROCESSES.

The cells which occupy the body of this bone, lying under the SELLA TURCICA, are to be seen at (*g*) Figure VI. and again in Plate VI.

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The

The HOLES proceed next in order, and are marked also with a suit of numbers, that the demonstration may be continued and entire.

1. (*a*) The two OPTIC HOLES, transmitting the Optic Nerves; which are the second pair of the scull; for the first pair, *viz*. the Olfactory Nerves pass through the Œthmoid Bone.
2. (*b*) The FORAMEN LACERUM; or wide hole, which permits the third, the fourth, the first branch of the fifth, and the sixth pairs of Nerves to pass; for all these are smaller Nerves, destined for the Orbit, and enter here, while the second pair is the proper Optic Nerve.
3. (*c*) The FORAMEN ROTUNDUM; it transmits the second branch of the fifth pair which goes to the upper Jaw.
4. (*d*) is the FORAMEN OVALE, (larger than the Foramen Rotundum) which transmits the third branch of the fifth pair, going to the lower Jaw.
5. (*e*) The SPINOUS HOLE, the Foramen Spinale, which is a small hole in the very point or tip of the Spinous Process. It is not for the transmission of a nerve; but for the entrance of that small artery which belongs to the Dura Mater, and which goes along the inner surface of the Parietal Bone, marking it with its furrow. A bristle is passed through this hole in one side, to show the course of the artery.
6. The sixth Hole. The PTEREGOIDEAN, or VIDIAN HOLE, is not to be seen in this view; but is to be seen in the next Plate, IV. where it is marked with its proper number, 6.

(*f*) Represents the rough surface where the cuneiform or wedge-like part of this Sphœnoid Bone has been broken off from the wedge-like process of the Occipital Bone.

(*g*) Marks the cells of the Sphœnoid Bone, which are occasionally very large, as in this Bone; and which make all the Bone hollow under the Sella Turcica.

(*h*) Shows where the Palate Bone had adhered to the Sphœnoid;—and the Palate Bone, being torn away, has broken, and left some of its small cells sticking here to the Sphœnoid Bone.

*N. B.* The Cells of the Palate Bone are explained in the next plate.

This bone is connected;—at (*i*) Figure VI. with the Œthmoid Bone before;—at (*f*) Figure V. with the Os Occipitis behind;—at (1) with the Temporal Bones in the Temples. The Spinous Process (3) is locked in betwixt the Temporal and Occipital Bones;——and the Pteregoid Processes (5) are joined to the Palate Bone, and form the back of the Nostrils. *Vide* next plate, where the Pteregoid Processes are seen in their place.

FIGURES

## FIGURES VII, AND VIII.

THE VII. and VIII. figures of this plate explain the UPPER JAW BONE; Figure VIII. showing its Internal Surface, viz. that next to the nose, with the wide opening of the Antrum, or Great Cavity of the Jaw. Figure VII. showing the outside of the Bone, explaining the outside walls of the Antrum, or great Cavity: so that, by comparing the two sides of the bone, one can easily understand the great extent of the Antrum, or Cavity; and how pulling a tooth will open the way for matter flowing out from it.

1. The NASAL PROCESS which rises up on each side to form the sides of the nose. The Arch forms the sides of the nose; and the rough pointed ending of this Nasal Process is connected with the Os Frontis.
2. Is the ORBITARY PLATE, or that plate which forms the floor of the orbit, and the roof of the Antrum, or Cavity.
3. The MALAR PROCESS, or that broad rough surface upon which the Cheek Bone rests.
4. The ALVEOLAR PROCESS, or that projecting semicircle, which holds the teeth; thence named Alveolar, or Socket Process.
5. The PALATE PLATE, or Process, of which we see the rough edge only, viz. that edge by which the Middle Palate Suture, the suture in the roof of the mouth is formed.

*N. B.* The Palate Plate is seen full in Plates IV. V. and VI.

6. The ANTRUM MAXILLARE, or HIGMORIANUM. This great cavity appears with a very wide opening here in the naked bone; but this opening is in part covered, in the entire scull, both by the lower spongy bone, and by the nasal plate of the palate bone. This nasal plate of the palate bone is left in this figure covering a part of the Antrum; the rest of this opening is naturally covered by a membrane, which leaves only a small hole.

The Nasal Plate of the Palate Bone which is left sticking upon the Antrum is marked (*a*).

(*b*) Marks the only complete Hole of the Upper Jaw Bone. It is named the Infra-Orbitary Hole. A chief nerve of the face comes out here, named the Infra-Orbitary Nerve.

The proper Infra-Orbitary Hole is marked (*b*); and the Canal by which the nerve comes down is marked (*c*); at this place the nerve lies under the eye, upon the floor of the orbit, making a very large groove and hole upon this Orbitary Plate of the Upper Jaw Bone; for arteries running along bones do not make deeper grooves than the nerves do.

*N. B.*

*N. B.* This Infra-Orbitary Nerve is a chief branch of the Superior Maxillary Nerve.

(*d*) Marks the FORAMEN INCISIVUM; so named from its being just above the Incisores or cutting teeth. It is also named Anterior Palatine Hole; it is complete only when the two jaw bones are joined, as in Plate IV. Fig. III. at (*l*) which marks this anterior Palatine hole.

(*e*) Marks the course of the Lachrymal Duct, or tube which conveys the tears, which, after having passed through the Os Unguis, makes this groove in the Nasal Process of the upper jaw bone, when the lower spongy bone is in its place, it completes this groove into a foramen.

PLATE

*Published for Longman & Rees. 1804.*

Engraved by JB

# PLATE IV.

*This Plate explains the Text Book, Vol. I. from Page 85, to Page 104.*

EXPLAINS the BONES of the FACE, and the LOWER JAW BONE.

## FIGURE I.

REPRESENTS the two NASAL BONES, laid to each other in their na- rection; by which is explained,

1. The NASAL SUTURE; joining these two Nasal Bones to each other.
2. The SERRATED SURFACE, by which they are joined with the Os Frontis, at the roughness round the root of the Nasal Process; which union forms part of the Transverse Suture.
3. The ROUGH SURFACE, by which they are joined to the two cartilages that form the Alæ Nasi, or Wings of the Nose.
4. The ROUGH SURFACE, by which they are fixed to the Nasal Processes of the upper jaw bone.

## FIGURE II.

EXPLAINS the OS UNGUIS, where both the drawings show that surface which appears in the orbit; and in both of them is seen,

1. The plain surface which is towards the eye-ball.
2. The Groove which holds the Nasal Duct.

## FIGURE III.

EXPLAINS, by a useful drawing, many very important parts on the basis of the scull. (*a*) the Foramen Magnum: (*b*) the Condyle: (*c*) the two Pteregoid Processes: (*d*) the Hook of the Inner Pteregoid Process, showing how the

Tendon of the Circumflex Muscle may twist round it: (*e*) the Styloid Process: (*f*) the Mamillary Process: (*g*) that part of the Palate, or roof of the mouth, which is formed by the upper jaw bones: (*h*) the smaller part of the Palate, formed by the proper palate bones; (*i*) the Middle Palate Suture: (*k*) the Transverse Palate Suture: (*l*) the Anterior Palatine Hole, or Foramen Incisivum: (*m*) the two Posterior Palatine Holes, transmitting the nerves for the palate; (*n*) the Vomer, or bone forming the septum or partition which divides the two nostrils: (*o*) the two Upper Spongy Bones, *viz.* those belonging to the Œthmoid Bone, hanging in their places high in the nostrils: (*p*) the two lower Spongy Bones, which are independent bones hung by a hook upon the side of the Antrum Highmorianum, and consequently hanging very low in the nostril.

## FIGURES IV. V. AND VI.

EXPLAIN the PALATE BONES; where Figures IV. and V. show the two Palate Bones separated from each other, and from the other bones. Figure VI. shows two Palate Bones joined. On these drawings, the same figures still mark the same points,—the numbers marking Processes, and the letters running under them marking as usual the lesser parts.

1. Shows the PALATE PLATE, or Process of the Palate Bones; and in FIGURE VI. the palate plates are joined, so as to form the back part of the middle palate suture: (*q*) is the broad rough surface by which the two palate bones are opposed to each other, and which forms the Middle Palate Suture: (*r*) is the middle point, from which the Uvula, Pap, or Gurgulion hangs down.
2. Is the PTEREGOID PROCESS of the palate bones, having a little hollow into which the Pteregoid Processes of the Sphœnoid Bone are received.
3. Is the NASAL PLATES, which lie within the nostrils; and which, by lying flat upon the sides of the Antrum Highmorianum, close it in part.
4. Is the ORBITARY PROCESSES; for the Nasal Process rises up along all the side of the nostril, and ends in a broader knob, which enters into the socket of the eye at its deepest part, and is there named Orbitary Process.
5. Marks the Cell or Cells of the Palate Bone, which are in its Orbitary Process, and which are joined to those of the Sphœnoid bone.

## FIGURES VII. AND VIII.

THE two SPONGY BONES.

FIGURE VII. Explains the rolled and spongy appearance of the spongy bone. It represents that surface which is turned outwards, *i. e.* towards the septum of the nose.

FIGURE VIII. shows that flatter side which is turned towards the Antrum Highmorianum, and closes it : and the letter (*s*) marks the small point, or hook-like process, by which this lower spongy bone is hung upon the edge of the opening into the Antrum Highmorianum. (*t*) is the fore end of the spongy bone, which is turned forwards in the nose, covering the lower end of the nasal duct ; so that in seeking to clear the duct with a probe, we must pass it under this point. (*u*) is the other end of the spongy bone, which is turned backwards in the nostrils. The position of the spongy bone in the nostrils is well explained in Figure III. and the fore part of the same spongy bone is seen in Plate VI. Figure II.

## FIGURE IX.

REPRESENTS the VOMER.

1. The GROOVE, in its upper part, by which it sits astride upon the Azygus Processes of the Œthmoid and Sphœnoid Bones.
2. Its Lower Groove by which it sits down upon the rising point of the Maxillary and palate bones ; and (*r*) Figure VI. shows how it stands upon the Palate Bones. The letter (*v*) Figure VI. shows the great Groove turned upwards to be fixed to the Azygus Processes of the Œthmoid and Sphœnoid bones, and the letter (*n*) Figure III. shows the Vomer in its right place in the nose, dividing the nostrils.
3. The Ragged Grooved Surface, which looks forwards and receives the plate of cartilage, which completes the partition betwixt the nostrils.

## FIGURE X.

REPRESENTS the CHEEK BONE.

1. Shows the Upper Orbitary Process.
2. Marks the Inferior or Lower Orbitary Process.
3. The Maxillary Process.
4. The Zygomatic Process ; and
5. Marks the plate which forms the lower and fore part of the socket for the eye, and so is named the Internal Orbitary Process.

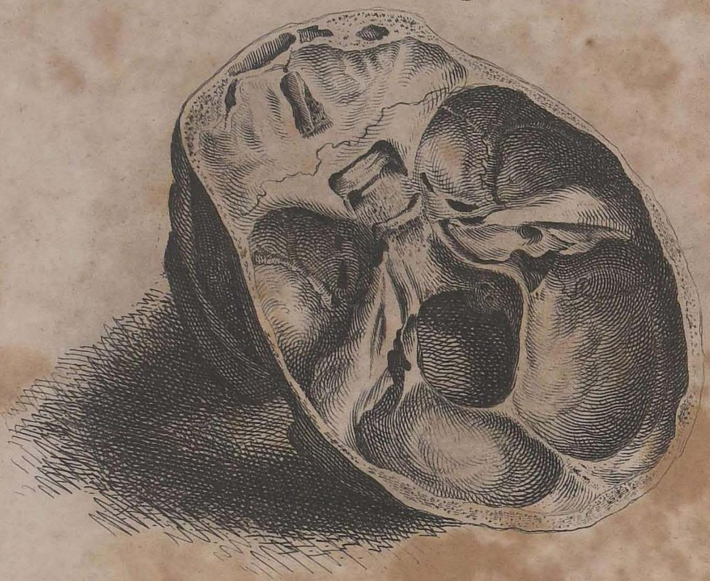
## FIGURES XI. AND XII.

EXPLAIN the lower jaw bone, in two views; but every Figure applies to each bone, and the Figures proceed in the order of the Text Book.

1. The CHIN; the lines comprehend the Chin in their course, and they terminate so as to mark the small Mental Holes on both sides of the Chin, where the nerve (mandebulo-labralis) after having furnished the teeth, comes out upon the face.
2. Marks the line of the Base of the Jaw, extending from the Chin to the Angle.
3. Marks the Angle of the Jaw, which is irregular and knotty, for the insertion of the great Masseter Muscle.
4. The Coronoid Processes of the jaw.
5. The Condoloid or Articulating Processes; (*y*) the great hole which receives the lower Maxillary Nerve. We see here likewise the deep and wide groove that leads to the nerve; and another deep, but smaller groove, which shows where the nerve which belongs to the tongue, departs from the great nerve, and runs along the inner side of the jaw bone to the tongue.
4. Is the ALVEOLAR or SOCKET PROCESS, with the teeth in it.

PLATE

I



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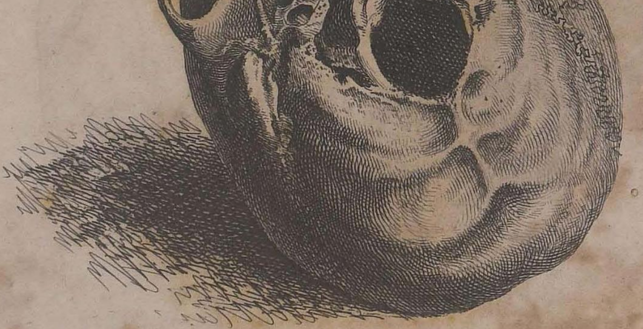
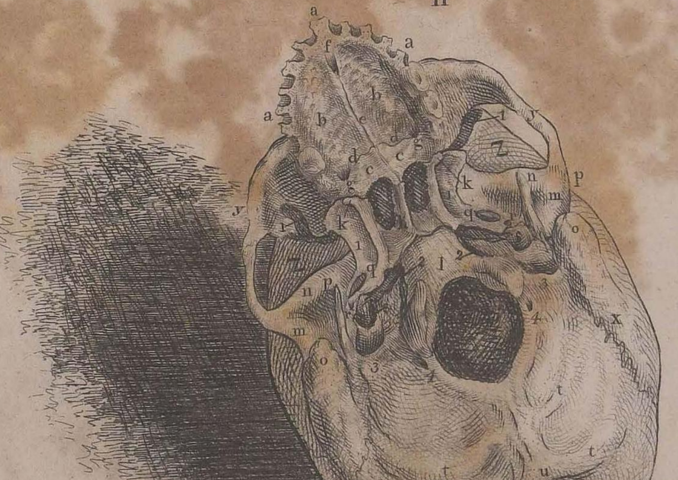


*Published by Longman & Rees 1804.*

I

II



Published for Longman & Rees 1804.

Engraved by J. Bell

# PLATE V.

*This Plate explains the Text Book, in all the Chapters upon the Scull.*

IS a general view of the CRANIUM,—explaining and connecting the demonstrations of the individual parts.

## FIGURE I.

IN this view, where the Cranium or Scull Cap is cut off, and the basis seen from within, the thing that first strikes the eye is,—the formal and regular division of the Cranium into three hollows (1. 2. 3.); and each of these is like a stage or deck, the one lower than the other.

(1.) Is the fore part of the basis of the Scull, the shallowest and most superficial hollow. It is formed chiefly by the Frontal, Œthmoidal and Sphœnoidal Bones. It is marked with undulating lines, corresponding with the intestine-like convolutions of the Brain.——This division supports the Fore Lobes of the Brain, and gives passage to the Olfactory and Optic Nerves.

(2.) Is a large hollow, cup-like, deeper than the first;——lying under the Temple; ——formed chiefly by the wings of the Temporal and Sphœnoidal, and by the corners of the Frontal and Parietal Bones, and behind by the Petrous Bones. This holds the Middle Lobes of the Brain,—gives out all the smaller Nerves belonging to the Eye, and all the great Nerves belonging to the upper and lower Jaws; it gives also the Auditory Nerves, which enter here into the petrous portion of the Temporal Bone.

(3.) Is a stage lower still, being the deepest hollow of the three; is formed chiefly by the cup of the Occipital Bone, and by a small part of the Temporal Bones;—and as the Cerebellum supports the back lobes of the Brain, this hollow may represent the back lobes, or the third division of the Brain;—so this last hollow contains the Cerebellum; gives out the eighth pair of Nerves, through the Foramen Lacerum; the Lingual Nerves, which pass through the condoloid hole of the Os Occipitis; and sends out the Spinal Marrow through the Foramen Magnum, or Great Hole.

FIRST

## FIRST DIVISION.

In the first division are seen the parts and holes of the FRONTAL, ŒTHMOIDAL, and SPHŒNOIDAL BONES.

### FRONTAL BONE.

(*a*) Marks the Cancelli, or Diploe of the Frontal Bone, so cut as to make the Cancelli appear very wide; but that proceeds from having cut the scull very low, which has taken off the outer layer of the Orbitary Process. (*b*) Marks the regular or proper Frontal Sinuses, which are thus understood to be like enlarged cells of the Diploe; while (*c*) shews a part of the cells going down into the Orbitary Plates: for the Sinuses sometimes extend thus all over the Eye, as in this Scull; and the letter (*c*), while it points to this extension of the Frontal Sinus, is so placed as to mark the undulating forms, which the lobes of the Brain give to this thin Orbitary Plate of the Frontal Bone.

### ŒTHMOIDAL BONE.

There is incased betwixt (*cc*) the Orbitary Plates of the Frontal Bone, the Cribriform Plate of the Œthmoidal Bone;—where (*d*) marks the Cribriform Plate with its numerous small holes for transmitting the Olfactory Nerves. (*e*) Marks the Crista Galli, whence the Falx begins. (*f*) Points to that hole which is called the Blind Hole, which is often as small as a pin's point, and which belongs in common to the Œthmoidal and Frontal Bones.

N. B. The small crack, to which the lines running downwards from (*d*) point, and which indicates the Suture surrounding the Œthmoidal Bone and named Œthmoidal Suture, can hardly be mistaken.

### SPHŒNOIDAL BONE.

The Sphœnoid Bone is known here by its two processes named TRANSVERSE SPINOUS, or LITTLE WINGS of INGRASIAS marked (*g*); the lines from the letter (*g*) point to the Sphœnoidal Sutures, which separate this Bone from the Frontal and Œthmoid Bones. (*hh*) Mark the two Anterior Œthmoid Processes. (*i*) Marks the Posterior Clinoid Process; for it is rather one Process terminating in

in two little horns or knobs. (*k*) Is set down in the Sella Turcica in the very centre of the Clinoid Processes which is the seat of the Pituitary Gland. (*ll*) Mark the two Optic Holes, which are scarcely seen, for they lie under the two Anterior Clinoid Processes, so as to be almost hidden by them :— The two lines going from the letter, (*m*) mark the two wide grooves, which are formed by the Carotid Arteries as they rise by the sides of the Sella Turcica; and the letter (*m*) itself sits upon a large groove made by the Optic Nerves, where they enter into the Optic Holes.

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## SECOND DIVISION.

This division shows points of the SPHŒNOID also, but chiefly of the TEMPORAL BONE, and of the Corner of the PARIETAL BONE.

### SPHŒNOID BONE.

(*n*) Shows the Foramen Lacerum under the Wing of Ingrasias, by which the 4th, part of the 5th, and the 6th Nerves enter into the socket. (*o*) Shows behind that, the Foramen Rotundum for the Nerve of the upper Jaw, viz. the second division of the 5th pair. (*p*) The Foramen Ovale for the third division, viz. the Nerve of the lower Jaw :—and (*q*) shews the Spinous Hole, which is large here that it may be seen, (for naturally it is extremely small), and the groove, formed by the great artery of the Dura Mater as it enters by this Spinous Hole, is also seen here (*r*) marked very hard and strong.

### PARIETAL BONE.

It is upon the corner of the Parietal Bone, that this groove (*r*) is formed by the Artery of the Dura Mater.

### TEMPORAL BONE.

The point of the Petrous Portion of the Temporal Bone is seen here projecting into the basis or floor of the Cranium. The point of the triangular Petrous Portion is marked (*s*); and the Internal Auditory Hole, by which the Auditory Nerve or 7th Nerve passes into the ear is marked (*t*).

THIRD

## THIRD DIVISION.

In this third division nothing almost but the Occipital Bone is seen; and its parts are these—(*uu*) The two great hollows in which the lobes of the Cerebellum lie, viz. the Cerebral Fossa.——(*v*) is the ridge betwixt these two hollows, which rises very high, is called the Internal Spine of the Occipital Bone, and has a small falx (somewhat like the larger one) attached to it. (*w*) Marks the Foramen Lacerum Posterius, or wide irregular hole betwixt the Temporal and Occipital Bones, through which the Lateral Sinus passes to go down into the Neck, where it forms the great internal Jugular Vein. And the 8th pair of Nerves, (viz. Par Vagum, Glosso-pharyneal and Spinal Accessory Nerves) accompanies the Vein through this hole.—(*x*) Stands upon the very middle of the Cuneiform or Wedge-like Process of the Occipital and Sphœnoidal Bones; for the two Bones meet here, without any determined or regular limits for either.—And (*y*) stands in the centre of the Foramen Magnum, by which the Spinal Marrow goes down into the canal of the Spine.

## FIGURE II.

THIS drawing explains the lower surface of the basis of the Scull. Here where it is turned towards the Neck and Throat, the surface is so rough, irregular, and confused, that it will not bear that fair arrangement and complete enumeration of processes which the first figure admits of. The surfaces chiefly to be observed, and which may serve in some degree to arrange the subject, are 1st, The JAW and PALATE BONES. 2d. The Root of the TEMPORAL BONES. 3d. The LOWER PART of the OCCIPITAL BONES.

1. About the Palate we observe,

(*a*) The Alveolar Process of the upper Jaw Bone, robbed of many of its Teeth; (*b*) the Palate Plate of the upper Jaw Bone, forming a chief part of the roof of the Mouth; (*c*) the Palate Plate of the proper Palate Bone, which forms nearly one third of the Palate; (*d*) the Transverse Palate Suture, which runs across the Palate, joining the Palate Bone to the Palate Process of the Jaw Bone; (*e*) the Middle or Longitudinal Palate Suture, which joins the Bones of the opposite sides; (*f*) the Foramen Incisivum, or Anterior Palatine Hole, lying just behind the first cutting teeth, and common to both Bones; (*g*) the posterior Palatine Hole, which permits the Palatine Nerve and Artery, to come down from the back of the Nostrils to the Palate.

The

The backs of the Nostrils are formed by the rising plates of the proper Palate Bones, and by the Pteregoid Processes. At the back of the Nostrils, we see, (*h*) the Vomer, so named from its resemblance to a plough-share, and standing exactly in the middle, for it is the partition of the Nose; (*i*) the Outer Pteregoid Process, forming the back of the Nostrils; (*k*) the Hook of the Inner Pteregoid Process, upon which the tendon of the Tensor Palati Muscle turns: and a small tip of the Palate Bones, which is at this point covered by these Pteregoid Processes of the Sphœnoid Bone, is named, the Pteregoid Process of the Palate Bone. And (*l*) marks the appearance outwardly of the Wedge-like Processes of the Occipital and Sphœnoidal Bones.

2. About the roots of the Temporal Bones we have,

(*m*) the Root of the Zygomatic Process, where the Condyle of the lower Jaw plays; and (*n*) the ridge just before the Condyle, upon the top of which the Condyle stands, in a dangerous situation, almost out of its socket when the Jaws are opened wide; and which it slips over, getting into the hollow for the Temporal Muscle, when the lower Jaw is dislocated. (*o*) Is the Mamillary, and (*p*) the Styloid Process, of the Temporal Bone. (*q*) Is the Oval Hole of the Sphœnoid Bone, for transmitting the great Nerve of the lower Jaw. (*r*) Is the Spinous Hole of the Sphœnoid Bone, for admitting the Artery of the Dura Mater. (*s*) Is the hole near the point of the Temporal Bone, for the Carotid Artery. (*ttt*) The Crucial Ridges of the Os Occipitis.—(*u*) the Posterior Tuber, or the acute and prominent point of the Occipital Bone.—(*x*) The Additamentum Suturæ Lambdoidalis, which joins the back corner of the Temporal to the Occipital Bone.

The Zygoma, as formed by the Zygomatic Processes of the Temporal Bone, and of the Cheek Bone, is marked (*y*); and the hollow under the Zygoma for lodging the Temporal Muscle and the branch of the lower Jaw to which that Muscle is attached, is marked (*z*); and is seen in this view on both sides full and large.

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## SUPPLEMENTARY EXPLANATION TO PLATE V. OF THE BONES.

HAVING, in doing the outline to this plate, found it possible to mark the points more correctly, I have added the following explanations in this supplementary page; and that they may unite easily with the first explanation, I repeat the essential points.



In

In the Upper Scull there are,

1. The Optic hole (*l*).
2. On each side of the letter (*m*), there is the likeness of a second Optic hole, but it is merely the impression which the last turn of the Carotid Artery makes.
3. (*n*) Is the Foramen Lacerum.
4. (*o*) Is the Foramen Rotundum.
5. (*p*) Is the Foramen Ovale.
6. (*q*) Is the Spinous Hole.
7. (*z*) Marks the round hole by which the Carotid Artery enters the Scull, after winding through a crooked canal in the Temporal Bone, about an inch in length.
8. The figure (8.) points to a great breach in the rocky part of the Temporal Bone; this breach is occasioned by the falling away of the cartilaginous part of the Eustachian tube. Therefore this wide breach is found in every church-yard Scull; and the hole for the Carotid Artery marked (*z*), opens where this breach ends.
9. It is observed of the great hole marked (*w*), for the passage of the Jugular Vein, that it is large and irregular; that it is almost divided into two openings, by a small projecting point; the line extending from the letter (*w*), touches exactly this small point. The eighth pair of Nerves passes in the smaller opening before the point, the Jugular Vein passes in the greater opening behind it; a small bridle of the Dura Mater goes across from this point, and makes the two holes distinct in the fresh Scull, and defends the eighth pair of Nerves from the pressure of the Jugular Vein, when (as often happens) it is turgid with Blood.
10. The number (10.) marks the hole under the Condyle by which the ninth pair of Nerves, the Lingual Nerve goes out.

In Figure II. the chief points are these,

(*f*) Marks the Anterior Palatine Hole.
(*g*) Marks the Posterior Palatine Hole.
(*h*) The Vomer, or Bone forming the partition of the Nose.
(*i*) The outer Pteregoid Process.
(*k*) The inner Pteregoid Process.
(*l*) The Cuneiform Process of the Occipital Bone.
(1.) Marks the Lateral Orbitary Fissure, or Foramen Lacerum, not that which is marked (*n*) in Figure I. but another Foramen Lacerum belonging also to the orbit, though not for the transmission of Nerves.
(*q*) Marks the Foramen Ovale.

(*r*) The

(*r*) The Spinous Hole.

(2.) Is that great breach which is left by the fading of the cartilaginous end of the Eustachian tube.

(*s*) Is the hole for the passage of the Carotid Artery, which as on the inside of the scull opens immediately behind the breach.

(3.) Marks the great thimble-like hole, by which the Lateral Sinus comes out from the Scull, to form the great Jugular Vein.

(4.) Is a hole seated behind the Condyle, the hole marked (10.) in Figure i. is before the Condyle, and gives passage to the ninth or Lingual pair of Nerves; this smaller hole is behind the Condyle, and gives passage to a small Vein of the Neck.

## PLATE VI.

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*This Plate explains the Text Book, in all the Chapters upon the Scull.*

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GIVES 1st, a general view of the CRANIUM, the reverse of the first plate; and 2d, a vertical section of the Cranium, which shews the relation and bearing of many important parts,—explains particularly the great train of sinuses or cells, which make all the basis of the cranium hollow,—explains also the spongy bones,—the Antrum Highmorianum,—the Nasal or Lachrymal Duct,—and the mouth of the Eustachian Tube, which is seen here stuffed out, and dried, to make its opening immediately behind the nostrils at the back of the palate more distinct.

### FIGURE I.

#### OUTSIDE OF THE SCULL *.

A. THE OS FRONTIS; where (*a*) marks the bump of the Frontal Sinus; (*b*) The Superciliary Ridge, dotted with marks of its Nutritious Arteries; (*c*) The Superciliary Notch, and hole which the Frontal Nerve and Artery make.

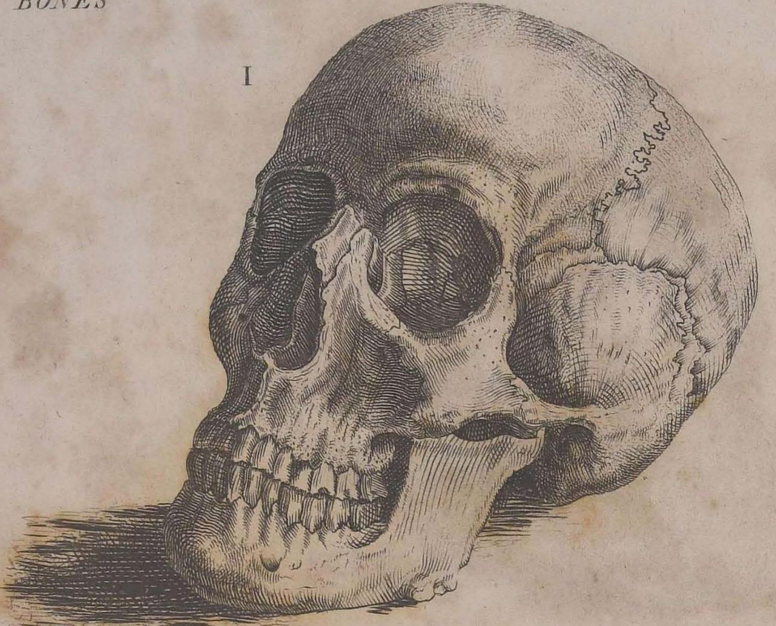
B. The Parietal Bone, and the letter is so placed as to mark that semicircular ridge where the temporal Muscle arises.

C. Marks the Temporal Bone. Where (*d*) marks the Meatus Auditorius; (*e*) the Mastoid Process; (*f*) the Zygoma; and (*g*) a Double Squamous Suture, as in the scull from which this was drawn.

* Let the reader remember that there cannot be a perfect correspondence of figures through all the plates; that no more could be attempted in the anatomy of the Bones, (a subject so irregular) than just to make each plate systematic and orderly in itself, without reference to any other plate. And so in each plate the great letters point to the general Bone, and the lesser alphabet marks and arranges the individual parts.

D. Mark

I



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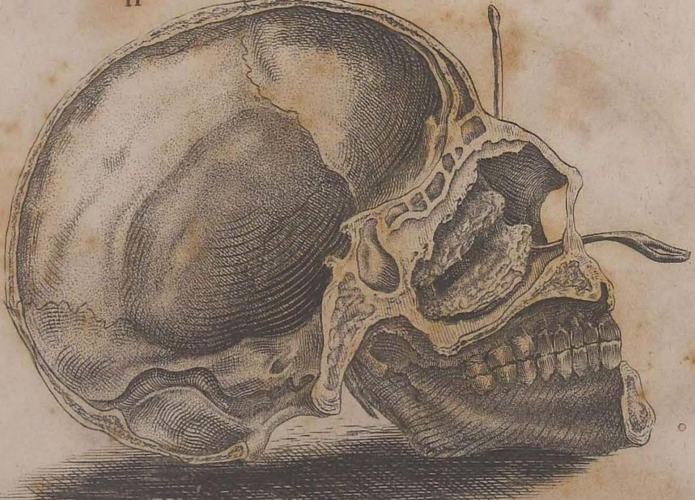

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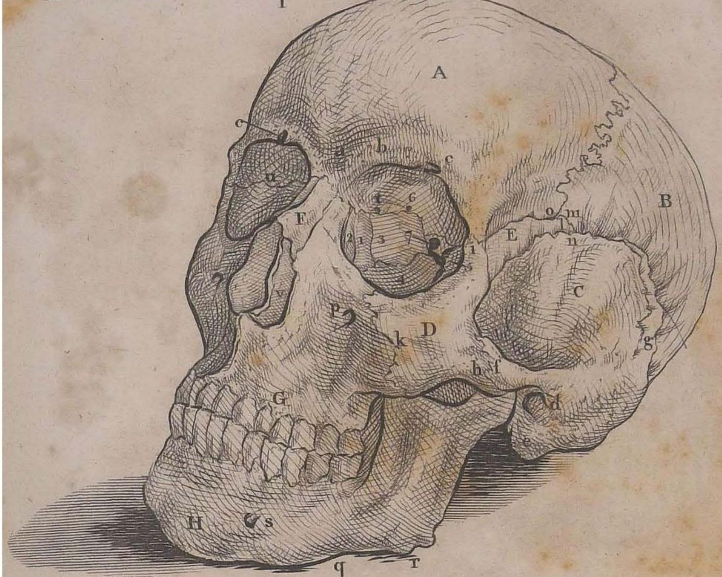
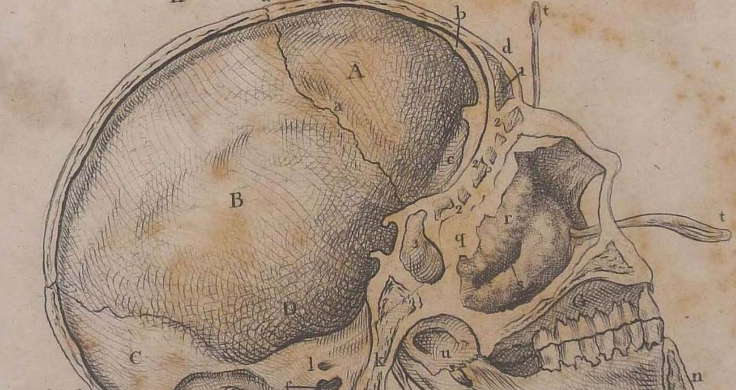
I




II

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D. Marks the Cheek Bone where all its connections are seen; (*h*) with the Temporal Bone; (*i*) with the Frontal Bone; (*k*) with the upper Jaw Bone.

E. Marks the Wing of the Sphœnoid Bone, where it lies in the Squamous Suture; and the four corners of bone forming the Squamous Suture, are (*l*) the corner of the Sphœnoid; (*m*) the corner of the Parietal; (*n*) the corner of the Temporal; and (*o*) the corner of the Frontal Bone.

F. Marks the Small Bone of the Nose, where the middle Nasal Suture is seen.

G. Points to the Upper Jaw Bone. The letter is placed upon the Alveolar or Socket Processes; and the small letter (*p*) marks the Infra Orbitary Hole.

H. Marks the Lower Jaw Bone, this letter touching the point of the chin; while the small letter (*q*) marks the line of the basis of the lower jaw; (*r*) the mark of the Masseter Muscle, the point into which it is inserted; (*s*) the Mental Hole by which a twig of the lower Maxillary Nerve comes out upon the face, just as the twig of the upper Maxillary Nerve comes out upon the face by the Infra Orbitary Hole, at (*p*).

In the Orbit, (*t*) marks the holes, which being within the Orbit, (for arteries and nerves passing down into the nostril,) are called INTERNAL ORBITARY HOLES, to distinguish them from the Supra Orbitary and Infra Orbitary Holes. Of these internal Orbitary Holes, one is named the ANTERIOR, the other is named the POSTERIOR, Orbitary Hole. So that in this drawing, there are seen all the holes around the Orbit, *viz.* (*r*) The Supra Orbitary Hole, or Superciliary Hole; (*p*) the Infra Orbitary Hole; and (*t*) the internal Orbitary Hole; this hole transmits a branch of the 5th Nerve into the Nose In the orbit is seen (*u*) the Transverse Suture on the right side pure; on the left side also it is seen, but appears very irregular as it really is, for it joins together a great many irregular bones.

Within the orbit some other parts are also seen here, which are not so well explained in any other plate.—The whole constitution of the Orbit is seen;—(1.) Marks the Os Unguis in its plain part where it is towards the eyeball.—(2.) Marks the Groove of Os Unguis, where the nasal duct lies; (3.) the Os Planum, which is in fact the plain side of the Œthmoid bone as seen Plate III. Fig. III. at (*e.*) (4.) Is the Orbitary Process of the Upper Jaw Bone. (5.) Is the Orbitary Process of the Sphœnoid Bone, which is exactly opposite to its Temporal Ala or wing (E.) (6.) Is the Orbitary Plate of the Frontal Bone, which forms far the greater part of the Orbit; and (7.) at the bottom of the Orbit, is the Optic hole, and near this is a part of the Palate bone.

In the Nose, the letter (*v*) denotes the Vomer, the bone which forms the partition of the Nose.

FIGURE

## FIGURE II.

### THE VERTICAL SECTION OF THE SCULL.

A. Is the Frontal Bone; where (*a*) marks the Coronal Suture seen from within like a mere crack, and not serrated or zig-zag, as on the outer surface of the scull; (*b*) marks the small projecting spine, to which the falx is attached, and which projects sometimes half an inch, making it impossible to trepan safely at this point; (*c*) the Orbitary Process, or plate, which lies over the eye; (*d*) the Bump marking the Frontal Sinus or cavity. (1.) The cavity or sinus itself, with a cross bar in it, as there commonly is.

B. The Inner Surface of the Parietal Bone; with the Artery of the Dura Mater, or rather its impression or furrow seen.

C. The Inner Surface of the Occipital Bone; where (*e*) marks the Winding Groove of the Lateral Sinus; (*f*) that Groove ending in the thimble-like cavity, and the thimble-like cavity ending in its turn in the Foramen Lacerum, by which the sinus gets out; and there passes along with it through this wide slit, the Par Vagum, or eighth pair of nerves. (*g*) Marks the thickness of the bone, at the place of the Crucial Ridge; (*h*) its thinness, where it is loaded and pressed by the lobes of the brain. (*i*) Shows the section of the Foramen Magnum. (*k*) Marks the Cuneiform Processes of the Occipital and Sphœnoidal-Bones *.

D. Marks the Temporal Bone, where (*l*) points out the Foramen Auditorium Internum, where the Auditory Nerve enters; and (*m*) marks the Styloid Process.

G. Marks the Upper Jaw Bone, where it forms the Palate.

H. Marks the Lower Jaw Bone, where (*n*) is the section, showing the Cancelli of the Lower Jaw; (*o*) is the angle; and here upon the internal surface of the angle, the Pteregoid Muscle is implanted: (*p*) the hole by which the proper nerve of the Lower Jaw, the inferior Maxillary Nerve, gets into the heart of the bone; and there going round, accompanied with an artery, a branch of each is given off to the central membrane of every tooth; and what remains of the Nerve and Artery after this, comes out by the mental hole upon the chin, to the lips; and the Nerve is therefore called *mandebulo-labralis*.

The curious parts seen in this section are;—The Cells, Spongy Bones, and the Eustachian Tube.

* There are two Foramina Lacera or wide holes, one belonging to the Sphœnoid Bone, in the bottom of the socket for the eye; and this one betwixt the Temporal and Occipital Bones, in the basis of the Scull over the neck or implantation of the vertebræ.

The

The Cells are marked (1. 2. 3.) for (1) Marks the beginning of this long train of cells, being the cells of the Frontal Bone, commonly called the Frontal Sinuses, communicating with each other, and with the nose. (2. 2. 2.) Mark the Cells of the Œthmoid Bone lying under the Cribriform Plate, and seen here by the cutting away of the Os Planum. (3) Marks the Great Sinus of the Sphœnoid Bone. It was pretty large in this scull, and is known to belong to the Sphœnoid Bone, by the Sella Turcica and Clynoid Processes, which are seen in the profile above it.

(*q*) Marks the back part of the Septum Nasi left; and looking past that, into the nostril, the Spongy Bones are seen; (*r*) the Upper Spongy Bone is already described as a mere process of the Œthmoid Bone, hanging thus downwards into the top of the nostril; (*s*) the Lower Spongy Bone, is an independent separate bone; small, as is expressed Plate IV., and hooked upon the edge of the Antrum Maxillare at this part; the opening of the Antrum is here marked (*s*).

The Lachrymal Duct is marked by the probe (*t*), passed upwards from the nostril, and it is seen, by the direction of this probe, that the duct opens into the nose, just under the point of the Lower Spongy Bone.

The Eustachian Tube is a large internal passage to the ear; which opens at (*u*) just behind the back part of the Palate, and at the back opening of the nostril: here it is well expressed, the drawing being taken from a scull which had the cartilaginous opening of the tube stuffed out and dried.

## PLATE VII.

*This Plate explains the Text Book, from Page 105, to Page 129.*

EXPLAINS the VERTEBRÆ, with all their processes and parts; and as the same parts return in each Vertebra, the several Vertebræ ought to be explained rather by ranks and orders, than as individual Bones.

### FIRST ROW.

The first row, consisting of Figures I. II. and III. is drawn for the purpose of contrasting the three classes of Vertebræ, viz. the Vertebræ of the Back, of the Neck, and of the Loins.

### FIGURE I.

REPRESENTS a Vertebra of the Loins; and the peculiarities of the Lumbar Vertebræ are these.

(1.) The body is large and broad, thick, spongy and loose in its texture, and tipped with a ring, (*a*) of harder bone.

(2.) The Articulating processes, or, as they are called, the Oblique Processes, are large, for they have to bear much force; they stand directly upwards and downwards; the four Articulating Processes, (the two upper, as well as the two lower,) are marked 2. 2.

(3.) The Spinous Process, is short, flat, very broad, and stands horizontally and directly out, so as not to embarrass the motions of the Loins.

(4.) The Transverse Process is short, direct, and very strong; and the Articulating Processes (2. 2) go off from the root of it.

In each Vertebra, there is formed by the roots of the Transverse and Oblique Processes, where they arise from the body, a ring or circle of Bone, which is in each drawing marked (*); it is for containing the Spinal Marrow.

FIGURE

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*Etched by J Bell*

## FIGURE II.

IS a VERTEBRA of the BACK; where,

(1.) The body is shorter, and is a large segment (viz. nearly two thirds) of a small circle.

(2.) The ARTICULATING PROCESS is small and flat, and a little inclined, but not very oblique.

(3.) The Spinous Process is long, aquiline, depressed to such an angle that the two Spinous Processes almost touch each other, (as is seen in Fig. IV.) (3. 3.) and allow of but a very limited motion.

(4.) The Transverse Process is long, stands directly outwards, or is inclined a little upwards, and upon every dorsal vertebra there are two marks for the articulation of the ribs; one (*b*) on the side of the vertebra itself, or rather betwixt the bodies of two vertebræ, for the proper head of the rib, (Fig. X. and XI.) (1.); and again there is another articulating surface (*c*) upon the face or fore part of the Transverse Process, which is for the articulation of the little knob (Fig. X. and XI.) (3.) upon the back part of each rib.

## FIGURE III.

THE CERVICAL VERTEBRA has these chief characters,

(1.) The body is small, firm, and of more solid and condensed bone than in the vertebræ of the loins or back.

(2.) The Articulating Process is truly oblique.

(3.) The Spinous Process is short, and is forked.

(4.) The Transverse Process is short, forked, and has a large hole in it for a great artery of the brain, which by its passing through this canal of the vertebræ is named Vertebral Artery.

## SECOND ROW.

This Row explains chiefly the connections of the VERTEBRÆ.

## FIGURE IV.

SHOWS the manner in which one Dorsal Vertebra sits down upon another, so that the Articulating Processes (2. 2.) check upon one another, and the

Spinous Processes (3, 3) are seen to be long and aquiline, and lying so over each other as to prevent all motion backwards or forwards, while the ribs limit the motion to either side. But in this drawing the one Spinous Process is tilted up from the other a little, owing to the want of that intervertebral substance which should lie betwixt the bodies. The hole is seen here at (*d*) betwixt the two vertebræ, by which a nerve goes off at the interstice between each Vertebra: so there are in all twenty-four nerves of the Spine, corresponding with the number of Vertebræ in the Spine.

## FIGURE V.

TWO Dorsal Vertebræ are here seen in their right position, connected by the intervertebral substance; with the end of one rib in its place; and at (*b*) is seen one articulating surface on the body of the vertebra naked. At (*c*) is seen the articulating surface, upon the face of the Transverse Process, naked. At (*d*) is seen the head of the rib covering the two articulating surfaces; connected at (*e*) with the body, and at (*f*) with the Transverse Process of its own vertebra.

## FIGURE VI.

IS a drawing of the INTERVERTEBRAL SUBSTANCE, which is of that ambiguous nature, that anatomists choose this name, to avoid the dilemma of calling it either Cartilage or Ligament, when it has not the character distinctly either of Cartilage or of Ligament. It is shown here as it is found betwixt the Lumbar Vertebræ; and the concentric circles of which it consists are better expressed towards the margin (*g*); but towards the centre, and especially in the very middle, it becomes soft, pulpy, the circles confused. The substance is so much softer in the centre, that there is almost a hole at (*h*), especially when the bone is allowed to spoil a little, as this one was. At (*i*) is seen a slight indication of the Spinal marrow, (which was also corrupted,) going down through the great hole of the vertebra.

## THE THIRD ROW.

Explains the forms of the ATLAS and DENTATUS; the two Vertebræ by which almost all the motions of the head are performed. Fig. VII. explains the Atlas; Fig. VIII. explains the Dentatus; Fig. IX. shows the way in which the Atlas sits down upon the tooth-like process and oblique shoulders of the Dentatus.

FIGURE

## FIGURE VII.

EXPLAINS the Atlas, or first Vertebra, where we find,

(1.) The body entirely wanting, and the place of the body supplied by Articulating Surfaces (2, 2,) so large as to give sufficient strength and thickness to the sides of the ring.

*N. B.* At the place where the body should be, there is at (*k*) a smooth Articulating Surface for the Tooth-like Process of the Atlas rolling. There is at (*l*) a little tip or point, which is tied by ligaments to the margin of the Occipital Hole; at (*m*) there is a sort of straitening in the ring, and at this point a ligament goes across the ring, dividing it into two, and holding firm the tooth-like process.

(2.) The Oblique or Articulating Processes of this vertebra are oval, and of a converging form; and this peculiarity in their direction limits the motions of the head, so that it cannot turn, but only nod, upon the Atlas.

(3.) The Spinous Process is wanting. A small knob represents the spinous process; and the want of this spine enables the Atlas to turn freely in circles upon the Dentatus.

(4.) The Transverse Process, also ending in a little knob, and perforated by the large hole for the Vertebral Artery.

## FIGURE VIII.

THE DENTATUS, where the points of description are,

(1.) The whole body of the Vertebra, rising gradually towards the apex or point of its axis or tooth-like process, which is marked (*m*.)

(2.) The broad flat articulating surfaces, like shoulders, at the root of the tooth-like process; upon which the atlas rests and turns.

(3.) The Spinous Process is short, thick, and forked.

(4.) The Transverse Process short, knobby, and perforated with the Vertebral Hole.

(*n*) Marks the Neck or Collar, the narrow part of the Tooth-like Process, where it is embraced by the Atlas;——and (*m*) marks the Apex or pointed extremity of the Tooth-like Process.——(*o*) Shows how deep the ring of this particular vertebra is, and how fairly triangular its great hole for the passage of the spinal marrow is.

## FIGURE IX.

EXPLAINS the manner of connection betwixt the ATLAS and the DENTATUS; shows the ring of the Atlas set down upon the shoulders of the Dentatus;—— and here all the parts are marked with the same numbers as in the other drawings.

## FIGURES X. AND XI.

ARE DRAWINGS OF THE RIBS: where we see,—(1.) the Head of the Rib, by which it is joined to the body of the vertebra.——(2.) The Neck or straitning beyond the head.—(3.) The Tubercle by which it is articulated with the Transverse Process.——(4.) Another little Tubercle, beyond this second articulating surface.——(5.) The Angle of the Rib, or the point from which it begins to bend forwards, (*p*) the Groove in which the intercostal artery lies. (*q*) The more spongy end of the rib, with a sort of rude socket, which receives the cartilage that joins it to the sternum.

## FIGURE XII.

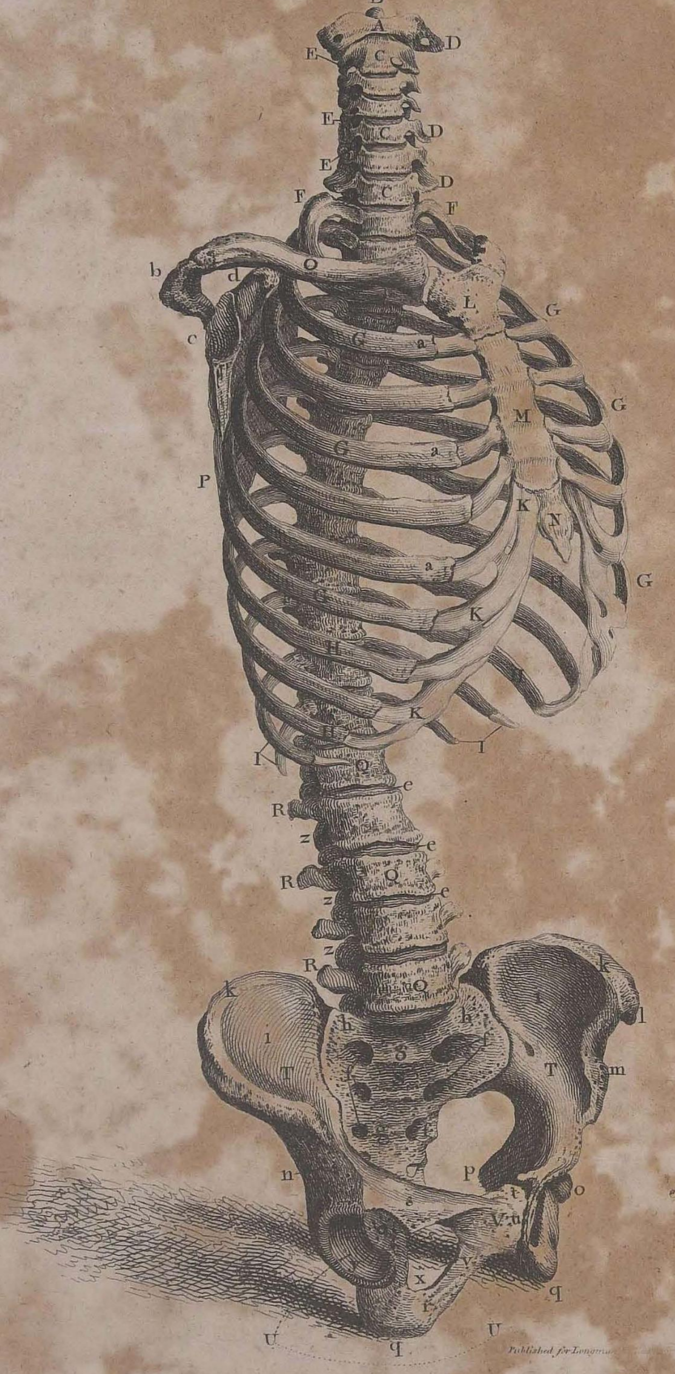
REPRESENTS the whole LENGTH of the STERNUM.

(1.) Marks the Upper Part of the Sternum; where (*r*) shows the pointed part of this first bone turned downwards to meet the second piece of the Sternum. (*s*) Is a hollow which makes way for the Trachea, &c. (*t t*) Are two articulating surfaces, by which the clavicle of either side is joined to this piece of the sternum.

(2.) The second piece of the Sternum, of great length, receiving the cartilages of most of the ribs; and the sockets for receiving the cartilages are seen, though not very fully all along its edge at (*u u*) &c.

(3.) Is the Ensiform Cartilage, which in most bodies is straight pointed, as in this drawing, but sometimes bifurcated;—sometimes bent down, or on the contrary turned remarkably upwards; very seldom ossified, except in those persons who are extremely old.

PLATE




*Published for Longman*

# PLATE VIII.

*This Plate explains the Text Book, from Page 105, to Page 147.*

Is a general view of all the Bones of the Trunk. It is chiefly useful by showing the general position of Bones which have been already minutely explained, and requires only a very loose and general explanation, because it is a general plate merely, upon which the parts and processes need not be minutely told.

A. The Ring of the first Vertebra or Atlas.
B. The Tip of the Tooth-like Processes of the Dentatus.
C. The Bodies of the Cervical Vertebræ.
D. Their Transverse Processes.
E. The Holes betwixt the Vertebræ, by which the Cervical Nerves come out from the canal of the spinal marrow.
F. The First Rib, lying flat and level here; and it is at this place, betwixt the clavicle and the first rib that the subclavian vessels come out.
G. The General Convex of the Thorax, formed by the middle of the ribs.—(*a a a*) Mark the ends of the ribs which receive the cartilages, by which the ribs are joined to the sternum.
G. Marks the Seven True Ribs.
H. Marks the 3 first False Ribs, whose cartilages run into the cartilage of the seventh rib.
I. Marks the Two Loose or floating Ribs, whose cartilages do not join the other cartilages, nor are united to the sternum; but stand out in the flanks, free and independent, their cartilages being buried in the thick flesh of the abdominal muscles.
K. The Cartilages of the Ribs.
L. The First or triangular piece of the Sternum.
M. The Second or long piece, which receives almost all the Cartilages.
N. The Third piece, as it is usually called; though it is merely Cartilage, to extreme old age.—This 3d piece N. is the Cartilago Mucronata, Ensiformis, or Swordlike.

O. The

O. The Clavicle, or Collar Bone, as it lies upon the top of the chest; and here it is seen how the bone by its proper position, keeps off and supports the scapula or shoulder-blades.

P. Marks the lower border of the Scapula. (*b*) Marks the Acromian Process, to which the Clavicle is connected.—(*c*) is the Glenoid or Articulating Cavity, for holding the shoulder bone; (*d*) is the Caracoid Process, showing how it projects on the inside of the joint, in the hollow under the arch of the Clavicle. —It is plain from this position of the process, that it should be felt on the breast just above the border of the Axilla.

Q. The bodies of the Lumbar Vertebræ, thick and massy to support the weight of all the parts above.

R. The Transverse Processes of the Lumbar Vertebræ, (*d d*) touch the Spinous Processes, where they appear in the interstices of the Transverse ones.—(*e e e*) Mark the intervertebral substances, or rather represent the putty, which is put betwixt the Vertebræ (in making our skeleton) to stand, in place of the intervertebral substance.

S. The Os Sacrum; where (*f f*) represent the holes of the Sacrum disposed regugularly in pairs.—(*g g*) Represent the white lines, which were cartilaginous in the child dividing the Sacrum into five pieces, but are now consolidated into white lines of prominent bone particularly hard and firm.——(*h*) Represents the joining of the Sacrum to the Os Ilium at either side, which joining is named the Sacro-Iliac Symphysis.

T. That division of the Os Innominatum, which is called the Os Ilium; where (*i*) marks the hollow bosom of that expanded wing, which lying obliquely outwards like the wing of a chariot, is called the Ala Ilii: the Iliacus Internus Muscle arises from this surface.—(*k*) Is the circle called the Spine or Ridge of the Os Ilium.—(*l*) Is the sudden sharp point, by which the Spine ends, and which is there named the Spinous Process, to which the name Anterior is added, to distinguish it from others, which lie concealed in the joining with the Sacrum. This Anterior Superior Spinous Process has another under it smaller and marked (*m*), which is called the Anterior Inferior Spinous Process.——It is merely a small Bump, over the top of the socket for the origin of the Rectus Muscle. (*n*) Marks the back or Dorsum Ilii, from which the Glutæi Muscles arise.

U. U. These two letters intersect all that part of the Os Innominatum, which is called Ischium; where (*o*) marks the body of the bone, where it forms a chief share in the socket. (*p*) Marks the Spinous Process, which is seen through the opening of the Pelvis projecting towards the Sacrum.——(*q*) Marks the Tuberosity or Bump of the Os Ischium, the lowest point of the Pelvis, and the part upon which we rest in sitting; and (*r*) marks the Ramus, or branch of the Pubis, as it rises to meet a like branch of the Pubis.

V. Marks

V. Marks the third piece of the Os Innominatum, *viz.* the Pubis;—where (*s*) is the body, where it forms part of the socket for the thigh bone;——(*t*) the highest point named Crista Pubis;——(*u*) points to the Symphysis Pubis, or joining of the opposite bones;—(*v*) marks the leg of the Pubis, descending to meet the leg of the Ischium. The Rami of the Ischium and of the Pubis form, with the other parts of the Os Innominatum; first the Arch of the Pubis;—secondly, the Thyroid Hole; and the Rami are said to meet one half belonging to the Pubis, and one half to the Ischium, because they are in fact separate in the child; a clear transparent cartilage, being interposed betwixt them.——(*x*) Marks this Thyroid Hole; and (*y*) marks the Acetabulum or socket for the thigh bone.

PLATE

# PLATE IX.

*This Plate explains the Text Book, from Page 147, to Page 158.*

REPRESENTS the THIGH BONE, TIBIA, and FIBULA.

## FIGURES I. AND II.

REPRESENT the fore and back views of the THIGH BONE.——And in order that the letter press may proceed in the regular order of a little description or demonstration, the small figures are put upon each drawing; so that any number that is wanting on one drawing, must be found on the other.

The FIRST FIGURE shows the back part of the Thigh Bone, which is marked by our seeing here, from behind, the length of the neck of the bone;—the manner of its rising out of the two great processes, the Trochanters;—the projection and roughness of the Linea Aspera, and the deep hollow betwixt the Condyles.

The SECOND FIGURE, or the fore view, is exceedingly simple, having no strong marks. The Linea Aspera is turned almost out of sight. The chief peculiarity of the fore view is, that it shows the bending form of the bone.

### THE POINTS OF DESCRIPTION ARE,

(1.) The Body:—very thick, strong, of a cylindrical form, bending outwards with a gentle curve.

(2.) The Head, which is very smooth, and very fairly circular. It is a large segment of a small circle, and is let pretty deep down into its socket. There is a dimple at (*a*), which marks the place where the central ligament once was.

(3.) The Neck of the Bone, long, and almost horizontal, to set the shaft of the bone the wider off from the Haunch Bone, that it may move freely.

(4.) The great Trochanter, a large bump or process for the insertion of the Glutæi Muscles.

(5.) The

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(5.) The lesser Trochanter, a smaller process, for the insertion of many muscles which move the Thigh Bone forward, and turn it.

(6.) The Linea Aspera, or rough line, from which much of the Muscular flesh that covers the thigh arises.——And this Linea Aspera, or rough line, begins at (*b*) in a forking form from the roots of each Trochanter:——the two lines meet, and the Linea Aspera becomes single in the middle of the thigh, (*c*)—Towards its lower end (*d*) it forks again to go off towards each Condyle, in what may be called the Internal and External Spine.

(7.) The two Condyles, which form the great articulating surfaces of the Thigh Bone, where it lies in the knee-joint.—In Fig. II. we see that the inner Condyle (*e*) is the larger one; being larger to compensate for the oblique direction of the thigh bone. At (*f*) Fig. II. we see, covered with cartilage, the flat polished surface upon which the Rotula or knee-pan rolls.—And in Fig. I. at (*g*) we see the very deep notch betwixt the two Condyles, in which the crucial ligaments of the knee-joint lie.

## FIGURE III.

### THE TIBIA.

THIS is a drawing of the right TIBIA, seen from before. The upper end belonging to the knee is large and broad, and is likened to the trumpet end of a pipe. ——The lower head belonging to the ancle is small, and has one projecting point, *viz.* that which forms the inner ancle, and which is thought to resemble the flute-mouth of a pipe. The whole Bone has the triangular or prismatic form of the Ulna and Radius.

(1.) Is the upper head of the Tibia belonging to the knee-joint; where (*h*) marks a little tubercle or rising, which divides the two articulating surfaces from each other. It is from the back part of this tubercle, that the cross ligaments of the knee-joint arise. (*i i*) Mark the two lunar hollows, upon which the two Condyles of the thigh bone rest, and in which the semilunar or moveable cartilages of the knee joint lie. (*k*) Is that rough circle which bounds the articulating surface, and from which the Capsular Ligament arises. (*l*) Is the tubercle or bump of the Tibia, upon which we rest in kneeling, and into which the great fore tendon called the Ligament of the Patella is fixed: and (*m*) is the prominent ridge of the shin, which begins from this tubercle, and goes downwards in the waving form of an Italic *f*. (*u*) Is that part of the Tibia which receives the upper end of the Fibula.

(2.) Is the middle part of the Bone, which is of a triangular or prismatic form, and the figure (2) is repeated upon each of the three angles.

(3.) Is the lower and smaller head of the Bone belonging to the ancle joint; where (*n*) marks the smooth hollow which receives the bones of the foot, and which is named (like the articulating surface of the Radius), the Scaphoid, or Boat-like cavity of the Tibia. (*o*) Marks the projection or process of the inner ancle, which guards the joint, preventing luxation inwards. (*p*) Is the small cavity on the side of the Tibia, which receives the lower head of the Fibula, in the way that is represented in next plate.

## FIGURE IV.

IS a drawing of the Fibula, which is a long slender bone, so extremely simple in its form, that there needs be no further description than this, that the shaft of the bone (*q*) is exceedingly slender,——is much longer than the Tibia, and is triangular like the Tibia. The upper end (*r*) is laid under the projecting head of the Tibia, at (*u* Fig. III.) and it is laid flat upon it; so that this articulating and smooth surface (*r*) is smooth only for the sake of a very slight degree of shuffling motion.

The lower end (*s*) is the larger.—It unites with the lower end of the Tibia (*p*. Fig. III.) to form the ancle joint. This guards the ancle joint without, as the Process of the Tibia guards it within. And this smooth articulating surface (*t*) is for receiving the side of the Astragalus, that bone of the foot by which chiefly the ancle joint is formed.

PLATE

Published for Longman & Rees, 1801.

# PLATE X.

*This Plate explains the Text Book, from Page 153, to Page 166.*

EXPLAINS the CONNECTIONS of the TIBIA and FIBULA, and all the BONES of the FOOT and of the TOES.

## FIGURE I.

SHOWS the TIBIA and FIBULA laid to each other as they lie in the leg; and here all the letters and figures, explaining the Tibia and Fibulæ of the last plate are put upon the very same points; so that no new letters nor figures are required, except (*v*), to mark that space betwixt the Tibia and Fibula in which the Inter-osseous Membrane lies; and (*x*) to show the arch which is made by (*o*) the process of the inner ancle, and (*s*) the lower head of the Fibula forming the outer ancle: for the deepness of the arch, and the projection of these two points, show how very secure the ancle joint is; the smooth head of the Astragalus marked (*a* Pl. X. Fig. IV.) being received deep into this arch.

## FIGURE II.

SHOWS the Outer Surface of the Rotula or Patella, which is rough, and marked with many points where its nutritious arteries enter, or where it incorporates with the strong sheath of tendon which covers it.

## FIGURE III.

SHOWS the Lower Surface of the Patella, viz. that which is turned towards the cavity of the joint; and here there is seen a rising line at (*,) which lies in the great hollow betwixt the two Condyles;—while the two hollows on each side of this rising move upon the convexities of the Condyles. In short, this smooth inner

inner surface of the patella is moulded as it were upon the surface marked (*f*) in the last plate, Figure II.

## FIGURES IV. AND V.

EXPLAIN all the Bones of the Foot, viz. of the TARSUS, of the METATARSUS, and of the TOES.

The bones of the Tarsus are 7 in number, fewer and larger than the bones of the Carpus.

(1). The Astragalus is that great bone which immediately forms the ancle joint;—where (*a*) marks the great ball or cartilaginous pully which is received into the arch formed by the Tibia and Fibula.——(*b*) Is the flat side of the bone upon which the processes of the inner and outer ancles lie, embracing the joint closely.——(*c*) Is a little flat neck or projection which lies over the heel-bone. (*d*) Is the neck of that large round head which makes a ball and socket joint with the Os Naviculare, which is marked (3).

(2.) The Os Calcis lies under the Astragalus, and is the largest of the Tarsal Bones, supporting all the weight of the body; and here these points chiefly are seen.—(*e*) The tip of the bone, which looks upwards, receiving the Tendo Achillis, or great Back Tendon.——(*f*) The lowest rough point; the point of the heel upon which we stand.——(*g*) The head, by which the Os Calcis is joined to the Os Cuboides, marked (7.) the Os Cuboides being received at this part into a large hollow socket of the Os Calcis.

(3.) Is the Os Naviculare or Scaphoides, which has been so named from its resemblance to a boat. But if there be any such resemblance it is effectually concealed in all these views. The Os Naviculare has rising edges and a fair round socket, which is turned towards the Astragalus (1.) to receive the large round head of that bone.

(4, 5, and 6.) Are the Cuneiform or Wedge-like Bones; and in this view the square external surfaces chiefly are seen; — and these Cuneiform Bones, ought just to be reckoned simply according to their order, the first, second, and third cuneiform bones, beginning with that which supports the great toe.

(7.) The Os CUBOIDES is a large square or cube like bone, as its name implies, but by no means a regular cube.——It forms a large share of the Tarsus, and supports the Metatarsal Bone of the Little Toe.

The Cuneiform Bones are less easily understood, and I have therefore made a second drawing of the foot, FIG. V. (where the same letters and marks are

still

still preserved,) in which I have shown the point of the Cuneiform Bones, the Metatarsal ones being take away. In this figure the faces of the Cuboid and of the Cuneiform Bones are directly seen. And it is understood why they are called Cuneiform or wedge-like bones, for the upper surfaces marked (4. 5. 6.) are broad and square ; —— while their lower surfaces at (*) are small and pointed ; These smaller ends of the wedges being turned inwards or towards the sole of the foot. In FIG. IV. (*h*) marks the five Metatarsal Bones ; so named from their being placed on the Tarsus. — (*i*) Marks the first rank or phalanx, — (*k*) the second, — (*l*) the third rank of the bones of the toes.

## FIGURE VI.

SHOWS the foot in profile, and explains particularly well the large head of the Astragalus (*d*). These drawings are just half the size of nature, whence it may easily be understood how large this head of the Astragalus is ;—as large fully as the head of the shoulder bone :—and the socket of the Os Naviculare, (3), into which this head of the Astragalus is received, is both larger and a deeper circle than the Glenoid Cavity of the Scapula, into which the head of the shoulder bone is received.

The manner in which the process (*c*) of the Astragalus is joined with the Os Calcis, (2) so as to allow of a shuffling motion, is also explained here. The great length of the first bone, or Metatarsal Bone of the great toe (*h*) is also to be observed, because it is sometimes to be cut away; and it should not be forgotten that it goes very deep into the foot.

The small Bone, commonly called Sesamoid Bone, from its resembling, or being thought to resemble, a grain of Sesamum (though it is much larger), is seen here at (*m*) lying under the ball of the great toe, where it is connected with the tendons of the short flexor muscles of the great toe.——There are commonly two under the ball of each great toe, and there are occasional Sesamoid bones under the other toes, and sometimes under the great joint of the thumb.

The several Phalanges, as they are called, or ranks of bones in the toes, need not again be explained.

The only important point remaining to be explained, is the double arch of the foot ; for there are two arches. First (*n*) the great and general arch ; ——the two points of which are the tip of the heel, and the ball of the great toe. These points alone of all the foot touch the ground. — The elasticity of this arch, proceeding from its numerous bones and their joinings, gives a spring

and

and ease in the step; and the arch is supported under the weight of the whole body, both by the particular ligaments belonging to the individual joints of the foot,— and more particularly by the Great Fascia or ligament, (I would call it,) of the sole of the foot, which from one point (the heel) extends to the root of each toe individually.

But there is also a second and particular arch, which the bones of the Tarsus form among themselves. This arch is explained by showing a large central hole, which is expressed in each of these drawings, and is marked (*o*) — In Fig. IV. there is only a darkness showing where this central hole is.—In Fig. V. the hole is seen fair (by the Tarsus being turned round, and is marked (*o*).) In Fig. VI. it is explained by a broken pencil, (*o*) thrust up through this central opening.

PLATE

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# PLATE XI.

*This Plate explains the Text Book, from Page 166, to Page 177.*

## OF the SCAPULA, CLAVICLE, and ARM BONE.

### FIGURES I, AND II.

EXPLAIN the Scapula, showing, 1st, its internal,—2dly, its external surface.

The Scapula or Shoulder Blade, is of a triangular shape. (*a*) Marks its flat surface, which is turned towards the ribs, hollow, to suit the convexity of the ribs.——And the letter (*a*) is repeated all over the surface, to show the little risings of this surface; for this is the part upon which the Sub-scapular Muscle lies; and these risings are the marks of its fibres.

(*b*) Shows the Outer Surface of the Scapula, which is in its turn a little convex;—is crossed by the Spine, or that high ridge (8) which divides it into two surfaces;—the lower surface (*c*) holding the infra-spinatus;—the upper surface (*d*) holding the supra-spinatus muscle.

THE LINES AND PROCESS OF THE SCAPULA ARE THESE;

(1.) Is the upper Costa or border of the Scapula, where (*e*) marks a notch, which is sometimes a complete hole, or when incomplete it is made out by a ligament. It gives passage to the Scapular arteries and nerves.

(2.) Is the Lower Costa or border, which is round, and at the place (*f*) gives origin to the Teres Major and Teres Minor muscles.

(3.) This long side is called the Basis of the Scapula, and has the great Trapezoid and Rhomboid Muscles implanted into it from above and behind; while the Serratus Anticus is implanted into it from before and from below.

(4.) Shows the Upper Angle which receives the Levator Scapulæ Muscle.

(5.) The Lower Angle.

(6.) The Glenoid or Articulating Cavity, which is particularly small and superficial, considering how large the head of the shoulder bone is.

(7.) The

(7.) The Neck of the Scapula so called; it is the smaller part which supports the head, though, properly speaking, there is no neck;—and when the head of the shoulder bone is said, in a luxation, to lie upon the neck of the Scapula, it lies upon the place marked (*g*).

(8.) The Spine of the Scapula, which divides the upper surface, and which, rising higher as it goes forwards, terminates at last in the Acromion Process.

(9.) Is the Acromion Process; it is just the end of the spine, which turns its flat side towards the head of the shoulder bone, and overhangs the shoulder to defend the joint, and prevent luxations upwards.

(10.) And there is still a farther security; for the Coracoid Process (10) stands upon the inner side of the joint, and defends it within. It is named Coracoid Process, from its being crooked like the beak of a crow.

## FIGURE III.

EXPLAINS the Clavicle or Collar Bone: a bone which is extremely simple in its form, and has few or no parts;—and in which the letter (*h*) marks the middle, the roundest part of the bone, that point which is most prominent in the breast; the part most frequently broken. (*i*) Marks the end nearest the Thorax, and shows the circular articulating surface, by which it is joined to the Sternum; and under this end a small moveable cartilage lies. (*k*) Marks the outer end, or that which is turned towards the shoulder blade: the Clavicle is flattened at this end, and touches the Acromion by one single point only.

## FIGURE IV.

THE Os Humeri, Shoulder Bone, or Arm Bone.

(1.) The head is large,—flat,—is a small segment of a large circle,—seems quite disproportioned to its socket, (6. Fig. I. II.)

(2.) Is the neck as it is called; though there is no proper neck; there being no length, nor narrower part betwixt the body and the head of the bone.

(3.) The Greater Tuberosity.

(4.) The Lesser Tuberosity;—the Greater and Lesser Tuberosities being two knobs, for the insertion of those muscles which come from the Scapula.

(5.) Is the Groove betwixt these tuberosities, for the passage of the long tendon of the Biceps Muscle, which runs here as a rope does in its pulley.

(*a*) Marks the roughness about one third down the arm bone, into which the tendon of the Deltoides is implanted.

(*b*) Marks

(*b*) Marks the place, where (a little below its middle) the Os Humeri turns flatter, because it is to terminate flat and broad, to favour the hinge-like joining of the bones of the fore arm ; and

(6.) Shows one ridge on the inner side of the arm bone ;

(7.) Shows another similar ridge or edge of the bone, on its inner side—each ridge running down towards its own Condyle.

(8.) Is the external Condyle, smaller and less projecting, because it gives origin only to the extensors of the hand and fingers, a set of muscles which do not need much power, nor the advantage of a long lever.

(9.) Is the inner Condyle, which is very long and very prominent, to give a greater power to those muscles which bend the hand and fingers.

The elbow joint, being a very strict and limited hinge, has a long articulating surface :—and there are properly two surfaces, one for the Radius, and one for the Ulna.

(10.) Is the longer articulating surface, to which the Ulna is so joined as to perform none but hinge-like motions.

(11.) Is a neat small round knob, tipped with smooth articular cartilage ; and to this small knob, the face of the button-like end of the radius is applied ; and by the roundness of this knob the radius is enabled to perform not only the hinge-like motions to accompany the motion of the radius ; but also its own free circular motions, by which the hand is carried round.

(12.) Is that very deep hole which the Coronoid Process of the Ulna checks into.

(13.) There is a similar one marked (13,) which belongs to the demonstration of the fore part of the shoulder-bone, and is to be seen by turning to the next plate.

## PLATE XII.

*This Plate explains the Text Book, from Page 177, to Page 190.*

EXPLAINS the RADIUS and ULNA, CARPUS and FINGERS.

### FIGURE I.

IN the drawing of the Os Humeri, all the descriptions and letters belonging to the last plate belong equally to this. This drawing were superfluous, but for the important purpose of shewing the back part of the articulating surface, where we do not find that round surface marked (11) in the last plate, and which is called the Lesser head of the Humerus, but only the hinge-like surface for the articulation of the Ulna. And the chief object of this drawing, is to show, that here also upon the back part of the Bone, there is a deep hollow betwixt the Condyles; on the fore part of the Bone the hollow is for receiving the Coronoid Process of the Ulna, which checks into that hollow when the arm is bent forwards; but here upon the back part, this deep hollow, marked (13,) receives the Olecranon, or great process of the Ulna, when the arm is extended. It is also to be observed; that in this drawing the twisted form of the Bone is well expressed and truly, not caricatured; for the edge does in fact turn thus round.

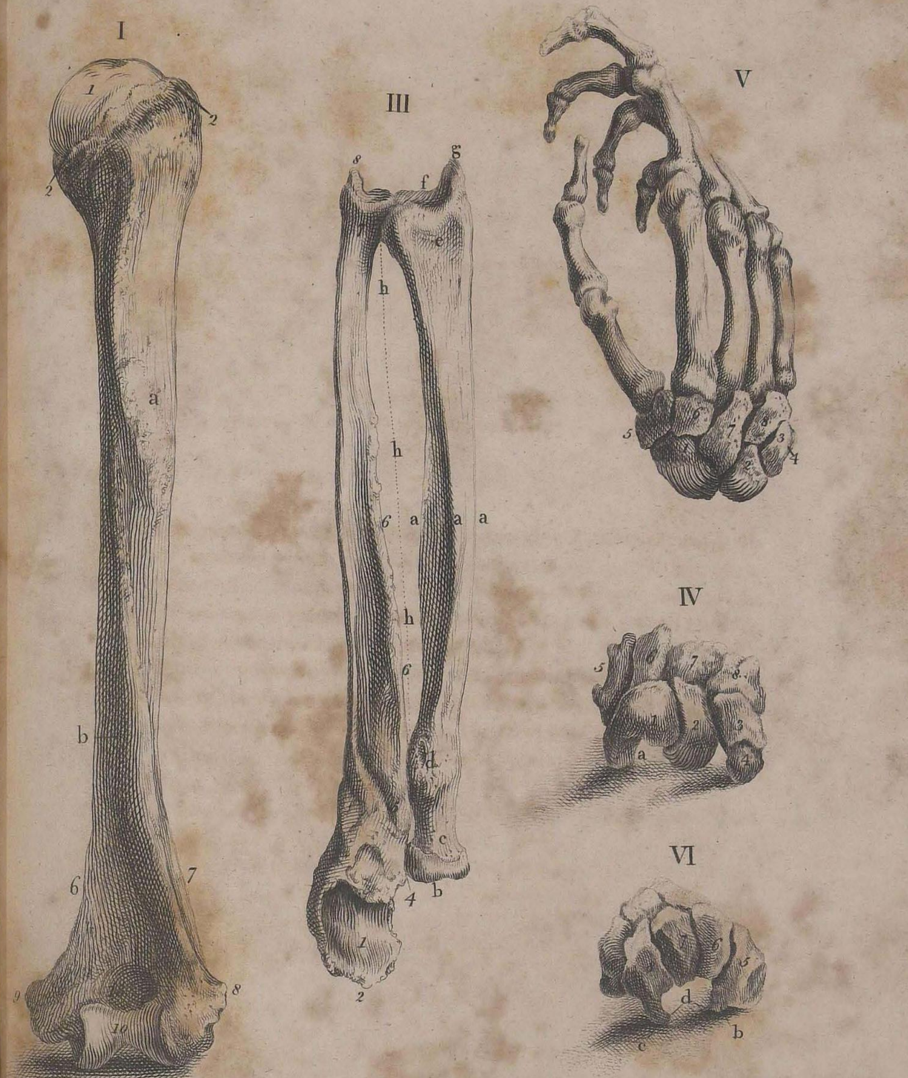
### FIGURE II.

THE ULNA.

THE Ulna is the longer of the two Bones which lie in the fore arm. The whole Bone is of a triangular shape, with three sharp edges; the upper end is larger, and belongs to the elbow joint; the lower or Little Head belongs to the wrist. The Bone has these points of description.

(1.) Is the great cavity, which receives the lower end of the Radius to form the Elbow joint, and this is called the Greater Sigmoid cavity.

(2.)

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(2.) The Olecranon, a large tubercle which marks the point of the Elbow upon which we rest, and guards the Sigmoid Cavity behind.

(3.) The Coronary Process which stands up, and guards the Sigmoid Cavity before.

(4.) The Hollow, where the side of the smaller button-like head of the Radius rolls, called the Lesser Sigmoid Cavity.

(5.) The Prominent Roughness, into which the tendon of the Brachialis Internus is implanted; and it leads to the sharp ridge.

(6.) The Sharp Ridge, from which the Inter-osseous Membrane goes off.

(7.) The Lower Head of the Ulna, which is small, and button-like; for it is received into a hollow on the side of the Radius, and it is upon this point, viz. the little head of the Ulna, that the Radius turns in the continual motions of the hand.

(8.) Is the Styloid Process of the Ulna, which is pointed, as the name implies; from it ligaments go off to strengthen the joint of the wrist.

## FIGURE III.

EXPLAINS the relative position of the Radius and Ulna. The Ulna is marked with figures according with the above description; the Radius is also marked with its points of demonstration.

1. (*a. a. a.*) Repeated on the three sides of the Radius, explain the general triangular form of the Bone, marking particularly its three edges.
2. (*b*) Marks the upper head of the Radius, flat, round and button-like, with the side rolling upon the Lesser Sygmoid Hollow of the Ulna.
3. (*c*) The neck of the Radius or straiter part, which immediately supports the head.
4. (*d*) The Bump or Tubercle of the Radius, into which the tendon of the Biceps Muscle is implanted.
5. (*e*) The Lower Head of the Radius; the Bone is thus gradually enlarging towards its lower end.
6. (*f*) The Scaphoid, or boat-like Cavity on the lower end of the Radius for receiving the two largest Bones of the Carpus;—forming the wrist joint.
7. (*g*) The Styloid Process of the Radius, which bounds the wrist joint towards the side of the thumb: and here it is seen how the little head of the Ulna (7) is received into the hollow socket on the side of the Radius.——The two sharp edges of the Radius and Ulna are opposed to each other, showing how the Inter-osseous Membrane stretches from the one Bone to the other, filling up all the space marked (*h.*) And it is here seen that the Radius is somewhat arched towards the Ulna, so as to roll round it without touching it, or hurting or disordering the numerous Muscles, &c. which lie upon the Inter-osseous Membrane.

## FIGURE IV.

EXPLAINS the Bones of the CARPUS or WRIST, as they are seen from the outside, or back of the hand.

The Bones of the Carpus are eight in number, they are divided pretty regularly into two rows;—and we rather choose to count and demonstrate them according to their rank, than as individual and separate bones: for as separate bones there is nothing very particular in any one; but by their combination and form, and as they relate to the wrist joint or to the fingers, it surely must be important, I should rather say, necessary, for the surgeon to remember them.

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## FIRST ROW.

### FORMING THE WRIST JOINT.

(1.) The Scaphoid Bone, where the figure (1.) marks the regular round surface, which forms a chief part of the ball and socket-joint of the wrist. And (*a*) marks the great hook-like projection of this Bone, whence that strong ligament which braces down the tendons of the Carpus arises.

(2.) The Lunated Bone, where the figure is so placed as to mark the large ball-like surface of this Bone which joins with the Os Scaphoides to form the ball of the wrist.——And the lunated part of the Bone is concealed, when thus joined with the others.

(3.) The Cuneiform Bone, of which only the broad or square surface is seen on the back of the wrist, while the narrower part of the wedge is in the palm.

(4.) The Pisiform Bone, so named from its roundness, this Bone is a little removed from the direction of the row to which it belongs.

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## SECOND ROW.

### RECEIVING THE METACARPAL BONES.

(5.) The Os Trapezium; or first Bone of the upper row named Trapezium, from its

its square and angular form. It has the ball of the thumb planted upon it, and the figure points directly to that socket which receives the thumb.

(6.) The Trapezoides, so named from its resemblance to the last.

(7.) Os Magnum, for it is the greatest; and it has a curious head which is in this view concealed under the Os Lunare; for the head of the Os Magnum is received into the semicircular hollow of the Os Lunare, forming a ball and socket joint with that Bone.

(8.) The Os Unciforme, or hook-like Bone; the hook of which is towards the palm, and therefore not seen in this view.

*N. B.* In this drawing of the Carpus, Fig. IV. this group of Bones is made to rest chiefly upon two of the corner Bones, viz. the hook of the Os Scaphoides, and the Os Pisiforme.

## FIGURE V.

IS also drawn chiefly with the intention of explaining the Carpus; and here the same numbers may serve, for the position of the Carpus is very little changed.

(1.) Is the Scaphoid Bone; (2.) The Lunar Bone, forming with the Scaphoid the ball for the wrist joint. (3.) The Os Cuneiforme. (4.) The Os Pisiforme is out of sight. (5.) The Trapezium which supports the thumb; (6.) (7.) (8.) The Trapezoides, Magnum, and Unciforme, supporting all the other fingers; and here the Os Magnum (7.) is seen a little fuller; so that the round head of it can almost be seen jointed with the Os Lunare. The 1*st*, 2*d*, and 3*d* Phalanges or or rows of Bones belonging to the several joints of the fingers, need not be explained; and the round heads for the joints of these finger Bones explain themselves.

## FIGURE VI.

PRESENTS the Carpus in a new direction; showing those Bones which are less perfectly seen in the other drawings;—and it is necessary to observe, that the group of the Carpal Bones is now turned, so as to shew that face of them which receives the Metacarpal Bones;—and the group now rests chiefly upon the points of the two upper Corner Bones, *viz.* the Trapezoid and Unciform Bones; as in the other view it rested upon the lower Corner Bones, *viz.* the Scaphoid and Pisiform Bones. So that here there is only the upper row fairly demonstrated, *viz.*—(5.) The Os Trapezium;—(6.) the Os Trapezoides;—(7.) the Os Magnum;—(8.) the Os Unciforme. (*b*) Marks a small pointed projection

jection of the Os Trapezium, whence the Carpal Ligament arises.—(*c.*) Marks the great Unciform or hook-like process of the Unciform Bone, which is another point whence the same cross ligament of the Carpus rises.—(*d*) Marks the arch which the Carpal Bones make, and the Tendons of the wrist lie in this arch, and are bound down by the cross ligament crossing from the one corner point, to the other.

THE

THE

# SECOND BOOK.

OF THE

# MUSCLES.

*Etched by J Bell*

*Published for Longman & Rees, 1804.*

# BOOK SECOND.

## OF THE

# MUSCLES.

## PLATE I,

### MUSCLES OF THE FACE.

*This Plate explains the Text Book, from page* 191, *to page* 213.

THIS Plate explains the chief Muscles of the Face; and there are seen here several Muscles also of the Neck, Throat, Shoulder, and Breast.—It was drawn from a subject that had been hanged, and the Neck being broken, the Head lies flatter upon one shoulder, than it should do even in the dead body; for the Atlas and Dentatus, the two first Vertebræ of the Neck, were fairly broken loose from each other.—The Muscles are more distinctly seen on the left side; on the right side they are thrown into shadow, and are but faintly indicated.—The muscles of the outline are truer in point of anatomy; while, in the full engraving, the general appearance, the thinness and delicacy, and the undefined connections of the muscles, are well expressed: and it is to be particularly noticed, that the Levator Anguli Oris (7.) is not so true in the engraving, while it is, I believe, very true and correct in the outline.

(1.) Is the OCCIPITO FRONTALIS, which covers the Occiput and forehead, with its two fleshy bellies, and the crown or top of the head with its thin flat tendon. The Occipital Belly is not seen here. The thin Tendon sometimes mistaken for the Pericranium, is marked (*a*); the Frontal Belly is marked (*b*); or rather there are two Frontal Bellies marked (*bb*). Each Frontal Belly sends a small slip of fibres, or a peak, down upon the back of the Nose marked (*c*)*. The Frontalis is connected chiefly with the skin, but little with the bone; is chiefly for furling up and wrinkling the skin of the forehead.

(2.) Is the CORRUGATOR SUPERCILII, more connected with the Orbicularis Oculi, than with the Occipito Frontalis, and lying under the Occipito Frontalis.

(3.) Is the ORBICULARIS OCULI; arising by a small white Tendon (*d*), from the Nasal Process of the Jaw Bone. Its fibres go in regular circles round the eye, and they are continued circles which return to the white Tendon in the corner of the eye, whence they first arise; the whole muscle is thin, flat, broad, very distinct, shuts the eye-lids, compresses the eye, squeezes out the tears†.

The CORRUGATOR SUPERCILII (2.) arises from the Os Frontis betwixt the Eyebrows, and lies under that Peak of the FRONTALIS which expands upon the back of the Nose.—This Corrugator may almost be considered as merely a slip of the Orbicularis Oculi (3.); for in fact the fibres of the Corrugator go round the orbit with the upper fibres of the Orbicularis Oculi, and mix with them, so as to form the upper edge of the Orbicularis; and thence the names of Corrugator and Orbicularis are sometimes interchanged‡.

(5.) § Is the LEVATOR LABII SUPERIORIS, and ALÆ NASI; This muscle arises by a small double Tendon, from the Nasal Process of the Upper Jaw Bone, and

* This Nasal Peak of the Occipito Frontalis is not the slip which is fixed into the Os Frontis; that lies deeper, while this Nasal Peak is superficial, runs down the back of the Nose, expanding upon it and forming with the muscles below a sort of fascia, or Tendinous expansion, which covers the Nose. This Nasal slip is implanted rather into the skin of the Nose, and wrinkles it; while the General Muscle corrugates the skin of the forehead.

† The whole of what we call the Orbicularis Oculi, is named by Walther, Corrugator Oculi; and he seems to divide it into an upper and lower portion, by the names of Musculus Semicircularis Palpebræ Superioris, and Musculus Semicircularis Palpebræ Inferioris.

‡ Walther, in his description of his own and Sanctorin's Plates, draws into the explanation of this Corrugator Muscle, all the upper part of the Orbicularis Oculi; as if it were but a part of the Corrugator.

§ It will be observed here, that the suite of the numbers 1, 2, 3, &c. is not regularly foll owed, because it was impossible to explain absolutely every muscle in any set of drawings, however full.

has

has one little slip (*e*) going into the Ala Nasi for dilating it; and another (*f*) going into the upper lip, for drawing it upwards*.

(6.) Levator Labii Superioris Proprius, arises from the Jaw Bone at the very edge of the Orbit, and above the Infra Orbitary Hole †. It has two slips of fibres, one (*g*) coming from the bone, from under the Orbicularis Muscle, and another slip (*h*), which is continued from the lower fibres of the Orbicularis Muscle itself. So this is a Biceps Muscle; it lies superficially; it draws the middle of the lip upwards; it is often named as a Biceps or two headed Muscle‡.

(7.) Levator Anguli Oris; arises above the dog tooth, and is thence named Caninus.—This muscle arises under the Infra Orbitary Hole, as the last arose from above it; this of course lies under the last, and so is less perfectly seen here. Its direction is different from that of the Levator Labii; as it runs more perpendicularly, or runs rather outwards than inwards. It is short; two headed like the last; rises properly from the Socket Process of the first Grinder. It lifts the Angle of the mouth, whence its name; and it operates on both lips, whence it is named, Levator Communis.

(8.) Zygomaticus Major; arises from the Zygomatic Process of the Cheek Bone; goes inwards to the corner of the mouth; is long, slender, oblique in its direction. It passes over that hollow in the Cheek Bone, which is filled up with fat, and so when the muscle is dissected, it falls into this loose flaccid and bending form§.

(9.) The Zygomaticus Minor, like it, but not always found.

(10.) the Buccinator, is seen here to lie deeper; it forms the flat part of the cheek; it arises from the Coronoid Process of the Lower Jaw, and from the roots of the back Grinders. It goes forward with direct fibres, (as seen here) towards the corner of the mouth.

(11.) The Triangularis, is neat, small, triangular; its base arises from the Jaw,

* "Maxime hunc in usum habent illi, qui detractores contemptoresque sunt aliorum, et forte hæc verba in uno vel altero eundum motum excitabunt."

† This is the Musculus Pyramidalis of Walther.

‡ Eustachius draws the muscle with these two heads. Albinus describes the little head (*h*), as a distinct part of the muscle, both in his explanation of Eustachius, and in his own plates. Cant observes this separate part proceeding from the fibres of the Orbicularis, so particularly as to reckon it almost a distinct muscle, a depressor of the lower eye-lid; saying, "Ex conspectu illum habere decet pro depressore Musculo Palpebræ Inferioris." *Cantii Impetus.*

§ This Zygomaticus Major, is sometimes split into two insertions at the angle of the mouth.

its point ends in the corner of the mouth.—It draws the corner of the mouth down, and is named Depressor Anguli Oris, or the Depressor Communis Labiorum.

(12.) Is the DEPRESSOR LABII INFERIORIS PROPRIUS. This muscle arises from the line of the Jaw, touches and crosses its fellow under the middle of the lower lip. They pull the lip downwards.

(13.) The ORBICULARIS ORIS, is thick, broad, and fleshy; forms the fleshy part of the lip; is in the red part of the lip, but is much broader than the red part. Its fibres are gross and strong, they go in a circular direction fairly round both lips, they are not interrupted at the angles of the mouth; they send up a small slip, which passing in the furrow of the lip, and mounting upon the Septum of the Nose, is named Nasalis, and is marked (*i*).

(15.) The CONSTRICTOR NASI, is here distinctly marked running over the point of the Nose*.

(30.) Is the TEMPORAL MUSCLE; which is seen here, lying under its fascia. The fascia, or Tendinous expansion of the Temple, being here entire, and nothing cut away but the Membraneous Muscles of the ear, the ANTERIOR and the SUPERIOR AURIS.

(31). Is the MASSETER, which is a short, thick, and fleshy muscle; and to lay it entirely open, the Parotid Gland which is marked (*k*), is dissected up from the cheek, so that the head of the Masseter is seen arising from the Cheek Bone; and its lower end is seen implanted into the Jaw†.

(*m*) Marks the FASCIAL ARTERY, or LABIAL ARTERY, as it is called, the Artery of the face, crossing over the angle of the Jaw.

Thus we see in the dead body, those muscles which give form and character the to human countenance, lying all dead and flaccid. The mouth open, the lips loose and shrivelled; the angles of the mouth dropping down, the cheek sunk; and the eye also closed, and sunk down within its orbit.—All the countenance is deformed, and the traits of individual character or beauty, quite gone:—but still enough remains to explain to us what those muscles are, upon which chiefly the interesting variety of expression and form depends. The Occipito Frontalis wrinkles the forehead: the Corrugator Supercilii knits the brows: the Levatores Labiorum lift up the lip, spread wide the nostrils, and open the mouth; the Depressores Labiorum depress the lip; the Triangular Muscles draw down the corners of the mouth; the Zy-

* This is the Transversus Nasi of Walther. The action of this muscle is very distinctly seen in the agony of an Asthmatic fit; it is seen also in violent distortion, produced by rage, or despair. Cant compares it to that muscle in the dog, by which he curls the Nose, and shows the teeth in snarling.

† This is sometimes called, the MUSCULUS MANSOR.

gomatic

gomatic Muscle distorts the cheek, and the Orbicularis Oris antagonises all these, and closes the mouth.—These muscles, while they are performing more important offices, also express the passions, and mark the countenance with traits never to be effaced, the true study of those who would be Physiognomists; who talk but idly, when they speak of expression in those immoveable features, which are formed rather by the Contour of a bone "The sagacious forehead or economical nose," are the rhapsodies of an Enthusiast, not the serious observations of a sedate man, studious of that subject, which is interesting above all others.

The shapes of the bones determine the general form of the face. One great muscle, the Masseter, gives the rounding of the cheek; the rest are all delicate and moveable muscles; and the great characters of the face, centre round the mouth and nostrils, where these muscles converge. The lean and delicate face, gains in expression where the cheek is hollow, the angle of the mouth moveable, the lines strong; but in those who are bloated, the cheek is fuller, the lines obliterated, the delicate turnings of thought and feeling are lost; all but the more violent strains of passion are buried in the mass. The great lines of character, are the line of the Zygomatic Muscle, coming from above, and of the Triangular Muscle coming from the chin; and the moving point towards which they all act, is the corner of the mouth. In chearful emotions the features rise all towards the eye, which becomes full and turgid. In the depressing passions the features sink, the eye is languid, and the whole countenance gets a thoughtful serious cast. But still it is the corner of the mouth, that is the central point of all these changes.

The corners of the mouth are continually supported by the action of the Levator, and of the Zygomatic Muscles; they are raised high in smiling, so as to form a dimple there. They are raised higher in laughter, so as to swell the cheek, wrinkle the eye-lids, and compress the eye, till tears begin to flow. And the corner of the mouth, which is thus raised in laughter, is distorted in pride, malice, hatred; is dilated and drawn backwards in rage; drops lower in grief; and in palsy falls quite down.

These movements round the angle of the mouth, are the chief indications in the face itself, while all other indications of passion, proceed rather from the general system. A healthy body, and chearful mind, have the face full, the eye humid, the limbs braced, the whole body free, and light moving. In languid health, or under affliction and care, the face is pale, the eye cold, the whole body languid and relaxed; and so it is in passion, for the medical arrangement of the passions is nearly correct. There are two great classes of passions, the exciting and the depressing passions: in the exciting passions, as joy or anger, the heart beats high; the face is turgid; the eye prominent and sparkling; the muscles are tense; the limbs braced; the whole

whole body is in a moveable, active, and highly excited state. But when the heart beats languid in grief, or palpitates with fear, the face becomes pale, the features sink, the limbs tremble, the whole frame is unbraced, cold, and unapt for motion; and from these general conditions of the system result all those other marks of passion, which accompany the changes of the face; for in grief, fear, despair, the blood ebbs, and the face is pale, and the features sink; while in anger the face is red, the eye brows corrugated, and the eye turgid and strained; but in rage, the whole muscular frame is strained toward the most violent action, the breath is retained, while the pulse beats high; and so the face becomes turgid, the eye is fiery and red, there is a grinding of the teeth, the angles of the mouth are strained backwards, the nostrils are raised and dilated, the Buccinator, Zygomatic, Masseter, and Temporal Muscles are in violent action, which gives an Angular and Linear hardness to all the features; and saliva and foam proceed from the universal pressure upon all the glands.

## MUSCLES OF THE EYE.

FIGURES XII. AND XIII. of Plate II. Explain the Muscles of the Eye.

The origin of the Muscles at the bottom of the Orbit, being once understood, all their mechanism will be very plain and easy, for this single point has been the chief difficulty from the first. Galen counted the Levator Palpebræ, as one of the proper muscles of the eye; Vesalius understood better than Galen the origin of the Recti Musculus from the bottom of the Orbit, but like Galen he has drawn the eye from Brutes, and has described its muscles, and drawn them in so confused a way, that it is not easy to comprehend that muscle of his, "which adheres in all its course to the Optic Nerve. (Septimus Oculi Musculus, nulla ex parte a visorio nervo liberatus.)" But even after this discovery of the true origin of these muscles, one author of very high reputation, Mr. Lieutaud, denied the origin of these muscles around the root of the Optic Nerve; believing that the fixed point, or centre of all these muscles, was a point a little to the outer side of that hole, by which the Optic Nerve enters the socket.

But now this point, of their general origin from the bottom of the socket, is universally acknowledged; and the chief dispute is, whether these five muscles, in arising round the root of the Optic Nerve, begin from the periosteum of the socket, or from the bone itself, or from the outer coat (the Dura Mater) of the Optic Nerve; or whether they do not arise by a particular ring, which surrounds the root of the Optic Nerve; for Valsava believed that these muscles began by a sort of ring, which as it surrounded the

root

of the Optic Nerve, he chose to call Circulus Moderatorius Nervi Optici. But in this dispute, as usually happens, both parties are right, and both are in some degree wrong; for two of the five Muscles arise more properly from the outer coat of the Optic Nerve, while the three others arise plainly from the Dura Mater, where it forms the periosteum of the Orbit; the Dura Mater gradually assuming the nature of a common tendon, from which those three Muscles arise.

The place where this tendon begins, is the inner end of that Foramen Lacerum which belongs to the Sphœnoid Bone, and which admits the smaller nerves to enter for the Muscles of the eye; for when the Dura Mater has come out by this hole from the Cranium into the Orbit, it assumes, just where it covers that hole, a hard and tendinous nature, becomes white, assumes the appearance of a tendon, and is in fact, the common Tendon by which three of the Muscles arise; and as this hole is below the Optic Nerve, and toward the outer side of it, the Muscles which arise by this common tendon are chiefly those which pull the eye outwards or downwards; and so this common tendon gives origin to the Abductor, Deprimens, and Adductor.

But those Muscles again which cover the upper part of the Optic Nerve, arise close round the margin of the Optic hole; they touch the nerve and adhere to it; by adhering to the nerve, they may be said to arise from the nerve, or from that Angle of the Dura Mater where it comes through the Optic hole, to go over the Optic Nerve. So the Levator and the Obliquus Superior arise from the Dura Mater, where it forms the sheath of the Optic Nerve; while the Deprimens, Abductor, and Adductor, arise by one common tendon from the Dura Mater, where it covers the Foramen Lacerum, forming the periosteum of the orbit.

This is all seen at (*a*), Figures XII. and XIII. where (*a*) shows the fringed edge of the Dura Mater surrounding the root of the Optic Nerve; (*b*) the origins of the Levator and Obliquus Superior, in the angle where the Dura Mater turns backwards. And (*c*) shows the origin of the Abductor and Deprimens coming from the Periosteum of the Foramen Lacerum, a little to one side of the great Nerve.

The only other difficult point, and which is more important still, since it explains the relative size, and shape, and course of these Muscles, is the true place of this central point from which the Muscles rise, or in other words, the true place of the Optic hole by which the Optic Nerve enters, and from the margins of which all these Muscles rise. This will be easily explained by the marginal plate, which shows the holes within the socket; the position of the eye with regard to those holes, and so explains the relative length of each of the Muscles.

1st, The eye is placed in the socket, as I have represented by the circle (*a*), not directly

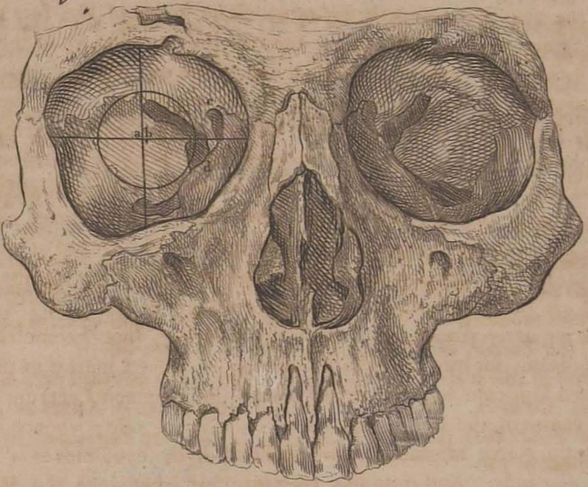
directly in the middle, but a little to one side. The eye does not look out from the Orbit in the direction of the Axis of the Orbit; for the axes of the two orbits meet almost in the bottom of the socket, crossing in the Cella Turcica, * but both the eyes look directly forwards. The plane of the fore part of the Orbit being oblique, and falling off towards the temple, while the eye looks directly forwards; the axis of the Orbit, and of the eye cannot coincide†. This is the reason of the Pupil, being nearer to one angle and not in the centre of the socket, for which we have the best authority, that of measuring the eye when we please. But the authorities of books on this point are these; Heister makes the Pupils distant three inches from each other. Camper makes the Pupils distant two inches and a half. But the eye being compared not with the other eye, but with its own socket, it is found that the centre of the Pupil is eight lines from the outer angle of the eye, and seven lines from its inner angle‡. These are my rules for placing the eye in its socket, in this plan. And the eye being thus regularly placed, we find by this drawing, (not geometrically true, but still sufficient for proving and illustrating so plain a matter as this is,) that the Foramen Opticum and the larger end of the Foramen Lacerum are much above the centre of the Orbit, and towards the inner side; whence it is plain that the Optic Nerve in going towards the ball of the eye, moves a little outwards and descends. And it is also very manifest, that since the Muscles, to get at their insertions must go round the globe of the eye; those which go round by the outer side of the eye, or pass under it, must be longer, while their antagonists which keep to the inner side of the eye or go over the globe, must be shorter. And so the Adductor Muscle which is on the side next the nose, is the only straight Muscle; it is the shortest, while the Abductor is the longest. The Abductor and the Deprimens Oculi, are the longer Muscles of the eye: The Adductor and the Levator Oculi, are the shorter Muscles.

In this plan, the centre of the socket (*a*) is marked by the crossing of its two diameters. The centre of the Pupil is marked at (*b*) nearer the inner angle of the eye, the Foramen Opticum is marked (*c*), and the inner end of the Foramen Lacerum is marked (*d*).

* Camper.
† Winslow, Academie des Sciences.
‡ Petit Academie des Sciences.

In

*Plan for the Muscles of the Eye*




In Figure XII. these points are seen; (*a*) the ring which the Dura Mater forms, where it comes from the brain into the Orbit, accompanying the Optic Nerve; (*b*) the origin of the Obliquus Superior and Levator, from this part of the Dura Mater surrounding the Optic Hole. (*c*) The origins of the Abductor and Deprimens, but the letter (*c*) points more particularly to the origin of the Abductor, which is here seen to be a Biceps, or two headed Muscle, having two Tendons, and the smaller nerves which belong to the Muscles of the eye are seen at (*d*), passing betwixt these two tendinous origins of the Abductor. For it is to be remembered, that this Abductor along with two of the Recti, rises from that part of the Dura Mater, which covers the Foramen Lacerum; and that the small nerves enter the socket by the Foramen Lacerum.

From this root round the Optic Nerve, the Muscles are seen going forwards.

1. The Obliquus Superior or Trochlearis (29) uppermost, the longest Muscle of the eye with its slender Tendon passing through the Cartilaginous Pulley (*e*), which is left still in its place attached to the Superciliary Ridge of the Frontal Bone (*f*).
2. The Obliquus Inferior, (30) is seen, the shortest Muscle of the eye, arising from the lower part of the Orbit, and going backwards to antagonize the last.

3. The RECTUS SUPERIOR (25) next to the Rectus Internus which it hides, is the shortest Muscle.
4. The RECTUS EXTERNUS (28) or Abducens Oculi, is the longest of all the straight Muscles of the eye.
5. The RECTUS INFERIOR or DEPRIMENS OCULI (26) is shorter than the Abducens, (28) but longer than the Reetus Superior (25), because the Optic Nerve enters a little above the centre of the Orbit. The Tendons of these Recti Muscles are seen expanding flat and broad upon the fore part of the eye; where, by shining through that thin and transparent skin, which covers the forepart of the eye, they form what is called the Albuginia, or white coat of the eye.

There remains but one Muscle belonging to the eye, and that is, the LEVATOR PALPEBRÆ SUPERIORIS (4); which is explained in FIGURE XIII. where it is seen rising from the upper part of the Optic Hole at (*a*), along with the other Muscles; it lies over all the other Muscles, and expands into a thin and membraneous flesh (*b*), which runs imperceptibly into the substance of the upper eye-lid; and seems to end in (*c*) the Tarsus, or Cartilaginous hoop of the eye-lid.

The XIV FIGURE of this plate explains the Muscles of the outward ear, as they are expressed by COWPER. Where (17) marks the SUPERIOR AURIS or Atollens; and (19) the POSTERIOR AURIS or Retrahens, as they are explained in the book of the Muscles, p. 240.

PLATE

Published for Longman & Rees, 1804.

## PLATE II.

*This Plate explains the Text Book, from page 212, to page 231.*

THIS plate belongs chiefly to the Throat; explains the Cartilaginous and bony parts, of which the upper part of the throat, and especially the flute part or Larynx is formed; shows the Os Hyoides; the Thyroid, Cricoid, and Arytenoid Cartilages; the Epiglottis; and the Membranes and Muscles by which these Cartilages are connected, so as to form a rigid tube consisting of parts moveable upon one another, and yet so firm upon the whole, as to be a protection to all the more delicate parts of the throat, and to be the centre of all the motions of the Jaws, and Tongue, and Windpipe, and Gullet; or of the Larynx and Pharynx, as they are called.

THIS plate explains first all the individual parts one by one; and then joins them, showing how the whole is composed; without which regular form of demonstration, nothing could be clearly understood of parts so very intricate and difficult, and having so long a catalogue of hard names connected with them.

## FIRST ROW.

The first row gives the parts single and entirely dissected; and there is represented (1.) The Os Hyoides, which resembles in its general form the lower Jaw Bone of a child, or what is called the Thought Bone of a fowl; (*a*) is its basis, (*b*) its horn, (*c*) the Cartilaginous joinings of the horns and body, and two little Tubercles stand perpendicularly up at the place of this joining, which are called the Cornua Minora or lesser horns, or Appendices of the Os Hyoides. These Cornua Minora are here represented in outline. The Os Hyoides is named also

also the bone of the Tongue, and its connections are especially to be observed, *viz.* that it lies in the root of the tongue; forms in a manner the top piece of the Trachea, is tied by a membrane to the Thyroid Cartilage, has the Epiglottis (5.) or valve of the windpipe planted upon it. And that these connections may be understood, this bone is marked with this figure (1.) in all the other drawings.

(2.) Is the THYROID OR SHIELD-LIKE CARTILAGE; which is indeed the shield of the Throat, for it is broad, flat, and very deep, and a full inch in length; it is thick, and often ossified. And accordingly it is this broad Cartilage that defends the more delicate parts; its upper horns (*dd*), are tied to the Os Hyoides by a long ligament; its lower ones (*ee*) closely embrace the Cricoid Cartilage. In this drawing, the Cartilage is set so as to rest upon its two lower Cornua, and to support and balance it a common pin marked (*), was thrust into it.

(3.) Is the CRICOID CARTILAGE; which is not, like the Thyroid, a semicircle merely, *i. e.* wanting at the back part, but is an entire ring which forms, as it were, the uppermost and firmest ring of the Trachea, but which still belongs properly to the Larynx. It is shallow before, and very deep in the back part of its circle, plainly for the purpose of raising the Arytenoid Cartilages, (those small Cartilages which form the Rima Glottidis or opening of the windpipe); and by this deepness at its back part, the Cricoid Cartilage raises the opening of the Glottis so high, (as is seen Figures vii. and viii.) that it is behind the very centre of the Thyroid Cartilage where it is well defended and safe. The Articulating Surfaces upon which the Arytenoid Cartilages sit down, are marked (*f*).

(4.) The ARYTENOID CARTILAGES, are the small and moveable ones, which are of a Triangular form; they are set down upon the upper border of the Cricoid Cartilage, by their base (*g*) with a very moveable articulation; and (*g*) points to the socket surface of the Arytenoid Cartilage by which the articulation is formed. For here the two uppermost drawings of the Cartilage are set opposite to each other, almost in their natural positions, and resting upon their basis while the lowest drawing of the three, is turned up so as to show its joint. The two sharp points of the Arytenoid Cartilages stand perpendicularly upwards, and give the shape and opening of the Glottis. The tips of the two Arytenoid Cartilages are seen over the Thyroid Cartilage in Figure viii. and the Cartilages are seen full in Figure vii. settled in their place, and forming the Rima Glottodis or chink of the windpipe, which is narrower or wider as they are moved by their muscles.

(5.) Shows the Epiglottis, which may be compared to an Artichoke leaf. It flaps down like a small tongue or valve, and, by clapping neatly down upon the Rima Glottidis, makes the food and drink glide clear over the Glottis, and into the Gullet or Pharynx. The Epiglottis is represented in this drawing, so

as

as to explain its connection with the Os Hyoides, and of course with the root of the tongue.

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## SECOND ROW.

The connections are explained in the figures of the second row; each part preserves its peculiar marks (1. 2. 3.) &c. and it is seen in figure vi. in what succession these parts stand.

## FIGURE VI.

(1.) The Os Hyoides, connected by its long horns with the upper horns of the Thyroid Cartilage. It is a ligament (*h*) of a full inch in length that connects them. And the common membrane of the Trachea is continued from the Os Hyoides, to the Thyroid Cartilage, so that the gap betwixt them is filled up by a strong, but thin membrane (*i*).

(2.) The Thyroid Cartilage is next, it stands forwards in the throat to defend the other parts; is distinctly felt without; is the most prominent part of the throat; and named Pomum Adami.

(3.) Is the Cricoid Cartilage, which in this profile of the throat, is seen to be very shallow before, as it is deep behind.

The Arytenoid Cartilages, (4.) are necessarily hidden in this view; and the Epiglottis (5.) is cut away, to make this drawing more simple and easy.

The Thyroid Gland is marked (6.) the chief part of it is seen on the nearer side of the Trachea, and a part also of the right lobe is seen coming round from the other side behind the Trachea, and almost surrounding it. (7.) Marks the Trachea, and the figure is here made to point to the uppermost ring, that the true place of the Thyroid Gland might be understood, for it lies not upon the Thyroid Cartilage (2.) nor upon the Cricoid Cartilage (3.) as might be supposed, but upon the second ring of the Trachea, leaving the first one free.

## FIGURES VII. AND VIII.

ARE chiefly useful in explaining the places of the two Arytenoid Cartilages, and the way in which they form the opening of the Glottis.

FIGURE VII. The Os Hyoides is cut away. The Thyroid Cartilage (2.) is seen in its place, defending and concealing the Arytenoid Cartilages; or at least the tips only

only of the Arytenoid Cartilages are seen (4.) peeping over the border of the Thyroid Cartilage. (3.) The fore-part of the ring-like or Cricoid Cartilage, is seen connected with the upper ring of the Trachea; but leaving an interstice (*k*) of a triangular form, at which point, (and not betwixt the rings of the Trachea), Mr. Vique D'Azir proposes to perform the operation of Bronchotomy.

FIGURE VIII. Shows the back view of the same dissection. The Os Hyoides is shown in outline, and in its true position with its small ligament which connects it with the upper horns of the Thyroid Cartilage; and here it is explained how (1. 1.) the two horns of the Os Hyoides project far beyond the Larynx. They belong more properly to the Pharynx, "and hold the Pharynx extended, as we "hold a bag open with the finger and thumb."

(2. 2.) Show how deep the Thyroid Cartilage is; how fairly it incloses the Cricoid Cartilage, and conceals and defends the Arytenoid Cartilages and the opening which they make; and here it is seen, that the edges of the Thyroid Cartilages belong also to the Pharynx, for the borders of the Thyroid Cartilage do, in fact, form part of the sides of the Pharynx; they assist the horns of the Os Hyoides, in keeping the bag of the Pharynx extended. And the Constrictor Pharingis, (44. 45. 46.) the great Circular Muscle which embraces the Pharynx, arises chiefly from the tips of the horns of the Os Hyoides, and from this projecting edge of the Thyroid Cartilage.

(3.) Is seen the great deepness of the Cricoid Cartilage behind, and it is seen by (4.), how the Glottis (which is just the opening betwixt the two Arytenoid Cartilages), is raised by this deepness of the Cricoid Cartilage, in its back parts.

The third row of figures exhibits the more important of those delicate Muscles by which the Cartilages are moved upon each other; but before these Muscles are explained, it is necessary to observe the place and effect of the Epiglottis, which is well seen in Figure x. and by the assistance of this figure joined with the demonstration of Figure vi. the succession of parts is very fairly explained.—1. The Os Hyoides.—2. The Thyroid Cartilage.—3. The Cricoid Cartilage follow each other in Figure vi.—4. The Arytenoid Cartilages, Figure vii. and viii.—5. The Epiglottis, Figure ix.—6. The Thyroid Gland, Figure vi.—7. The rings of the Trachea, betwixt which rings, and below the Thyroid Gland, the operation of Bronchotomy is to be performed.

This x. Figure then completes those connections of the parts of the throat; and the effects of accidental wounds, or of the attempts of Suicides, or of our operation of Bronchotomy will be easily understood. Suicides in their attempts very commonly cut so high in the throat, immediately under the jaw, that they seldom wound the Carotid Artery; nor do they even hurt the more material parts of the throat; for they strike so high, (commonly above the Thyroid Cartilage) that they do not touch the Trachea, nor injure the Glottis. They

only

only cut off the Os Hyoides from the Larynx; they do not so properly cut the throat as the tongue; and when the food passes by the wound, it does not come from a cut of the Œsophagus across the Trachea, but comes merely from the root of the tongue.

These Lateral views explain also how idle it is to talk of performing Bronchotomy above the Thyroid Cartilage, since the Thyroid Cartilage is not in the Trachea, and since the obstruction is below that point, being commonly in the Thyroid Gland, which is here marked (6).—Mr. Vique D'Azir is not more correct in his Anatomy, where he advises Bronchotomy to be performed betwixt the Thyroid and Cricoid Cartilages, in the Triangular Membraneous space marked (*k*) for that is exactly by the side of the Sacculus Laryngis, or Sac of the Larynx, a mucous secreting bag, which lies here on the inside of the Trachea; and the Trocar would lie almost in the opening of the Glottis, or so near it, that the irritation could not be endured. The Larynx cannot bear the operation of Bronchotomy, because it is moveable, furnished with many Muscles that are easily excited; and the least irritation near the Glottis, throws them into violent contractions. But the Trachea itself, can easily bear to be transfixed with the Trocar, which neither excites contractions, nor gives pain: besides the obstruction which requires Bronchotomy, is seldom in the tongue or mouth; more commonly in the Larynx; not unfrequently in the Thyroid Gland. So that almost all the occasions that can be supposed, are such as keep us down to the very lowest point of the Trachea, *viz.* That nearest the chest.

## THIRD ROW.

This row is for demonstrating the chief Muscles of the Larynx, and Pharynx; and of course, the motions of these several parts upon each other. And it explains, first, the Muscles which lie immediately upon the Cartilages of the Larynx, and which move the parts of the throat upon each other; and these lead to a knowledge of those longer Muscles, which come from the jaws, or chin, or sternum, or shoulder; and by which the whole throat is moved. These are represented carefully in the middle figure of this third row, and also in the next plate.

FIGURE IX. Explains chiefly the Hyo-thyroidæi, and Crico-thyroidæi Muscles: for first, The CRICO-THYROIDÆI (42), arise by a small pointed origin, (*l*) from the fore part of the Cricoid Cartilage; go upwards and obliquely outwards about an inch in length; are implanted by a broad insertion (*m*), into the lower border of the Thyroid Cartilage, and where they end, the next Muscle begins. For the HYO-THYROIDÆUS (41), is a long, flat, and fleshy Muscle, about an inch and a half,

half, or two inches in length; lying flat upon the smooth face of the Thyroid Cartilage; rising from the lower border of the Thyroid Cartilage below, and implanted broad and fleshy above, into the basis of the Os Hyoides a little to one side, and to a part of the horn. Sometimes this muscle is divided into two slips, as it is drawn by Cowper, but more commonly it is single, as represented here, and the upper end of the Sterno-hyoideus (34), is seen here marked with its proper number. The Sterno-hyoideus is implanted into the Thyroid Cartilage, at the point where the Crico-thyroideus (42) ends, and the Hyo-thyroideus (41) begins; so that the Crico-thyroideus is in part covered by the Sterno-thyroideus; and the Hyo-thyroideus again looks like a continuation of the same muscle.

In Figure X. are seen chiefly the small muscles by which the Cartilages of the Larynx are moved upon each other, modulating the voice. And the chief of these are, first, the Crico-Arytenoideus Posticus, and secondly the Arytenoideus Transversus.

The Crico-arytenoideus Posticus (45), "is a small Pyramidal Muscle, which rises " broader from the back part of the Cricoid Cartilage, where the ring is broad " and deep; and going directly upwards, is implanted with a narrow point into " the back of the Arytenoid Cartilage. This pair of muscles pulls the Ary- " tenoid Cartilages" backwards and outward, so that they at once lengthen and widen the slit; enlarging the opening of the Glottis. Under this lies the Crico-arytenoideus Lateralis, the smallest of these muscles, which arises from the rim of the Cricoid, and is inserted into the root of the Arytenoid Cartilage, and plainly separates the Arytenoid Cartilages, and widens the Glottis.

The Arytenoideus Transversus, (43) is seen here. It is seen crossing betwixt the two Arytenoid Cartilages, going from the root of the one, to the root of the other; its natural office being to contract, or occasionally to close the Glottis.

The Arytenoideus Obliquus, is a very delicate muscle which lies under this, in the same way that the Arytenoideus Obliquus lies under the Arytenoideus Posticus*.

The XI. Figure explains the Constrictores Pharyngis, and the Styloid Muscles; for (*n*) represents the Velum Pendulum Palati, cut off from the roof of the mouth, and hung out by strings; (*o*) is the Uvula or Pap, in the centre of it; (*p*) is the Anterior Arch of the Palate; (*q*) is the Posterior Arch; (*r*) is the Tonsil lurking betwixt the arches at the side of the root of the tongue; (*s*) is

* The young student should carry the throat to his room, wash it in a hand bason, steep and dissect there.—A piece of Anatomy, which with these drawings he will easily manage, which is hardly uncleanly, and cannot but be very important. It is indeed neglected only from being thought impracticable.

the tongue; (1.) is the Os Hyoides; (2.) is the Thyroid Cartilage; (3.) the Cricoid Cartilage; (6) the Thyroid Gland; (*t*) the Trachea; (*u*) a piece of wood thrust up through the Œsophagus, and appearing again in the throat at the back part of the tongue; and the great constrictor muscle is seen going in waves round this piece of wood; or in other words, coursing round the upper part of the Œsophagus, *i.e.* the Pharynx; and (*v*) is the last point of this demonstration, and the most important, for it is the Styloid Process, whence (39.) (53.) and (58.) the three Styloid Muscles arise.*

The muscles then which are to be seen in this drawing of the throat are, 1. The set of the three Styloid Muscles; 2. the Constrictor Pharyngis; and 3. the Vaginalis Gulæ.

The Styloid Muscles are, the STYLO-GLOSSUS (58) arising from the forepart of the Styloid Muscle, and going forwards into the substance of the tongue, stretching forwards into its point for drawing it back into the mouth.

The STYLO-HYOIDEUS (39), which begins rather from the back part of the Styloid Process, and goes here into the side of the Os Hyoides, being slender at its beginning, and broad towards its insertion, as all the Styloid Muscles are.

The STYLO-PHARINGEUS (53.) lies behind or under the Stylo-hyoideus; for it lies close upon the Gullet or Pharynx, expands upon that part of the bag where it is held extended upon the horns of the Os Hyoides; so that the Stylo-pharyngeus, when it expands upon the Pharynx, touches the horn of the Os Hyoides, which is marked (*x*), and as the middle constrictor of the Pharynx arises especially from that point of the Os Hyoides, the lower fibres of the Stylo-pharyngeus run alongside of the upper fibres of the middle constrictor, so that they almost mix.

These three Styloid Muscles perform the first movement in the act of swallowing, for they all coincide in lifting up the throat, pressing back the root of the tongue against the palate, (to straiten the arches of the Fauces;) and confining the morsel. By compressing the morsel, they push it down, and so begin that action which is completed by that strong Muscle of the Pharynx which is next seen.

For the CONSTRICTOR PHARYNGIS, (55.) is a very large and fleshy muscle, which covers five inches (in length) of the Œsophagus, and pushes down the morsel, which is already pressed by the contractions about the top of the Pharynx, and chiefly by the action of the Styloid Muscles. The Constrictor is fairly enough divided into three muscles, (54, 55, and 56.) of which the upper one, which cannot be seen here, rises about the back of the jaws, and from the basis of the scull, and from the root of the tongue.

* The Stylo-glossus I had described in my book of the muscles; but after classing it in the general arrangement, I had forgotten it in the description of individual muscles.



The

The MIDDLE CONSTRICTOR, marked (55) rises from tips of the horns of the Os Hyoides alone, and goes in a diverging form upwards, till it almost touches the scull, and downwards pretty low upon the Gullet.

The LOWER CONSTRICTOR (56) arises from the borders or wings of the Thyroid Cartilage, and from the ring of the Cricoid Cartilage. This is the thickest and fleshiest of all the Constrictors; it is very large, and goes obliquely upwards, covering the lower part of the middle Constrictor, and a small space is left, a kind of angle betwixt the two Constrictors, which is thin and membranous, and there the tips of the horns belonging to the Thyroid Cartilage, are faintly indicated, as shining through the thin membrane.

The ŒSOPHAGUS is still farther covered with a sheath of muscular fibres, which run in a perpendicular direction longitudinally along it, till they expand at last upon the stomach itself. This sheath of muscular fibres is called the VAGINALIS GULÆ, and is marked (57.)

PLATE

Published for Longman & Rees, 1804.
Engraved by J. Bell

I II

# PLATE III.

*This Plate explains the Text Book, from page 217, to page 220.*

THIS Plate explains the connection of the muscles of the throat; it explains chiefly the greater muscles coming upwards from the breast and shoulder; or downwards from the Styloid Process, pulling the throat upwards towards the jaws, or downwards towards the Sternum; and these muscles, though they belong chiefly to the throat, do occasionally move the jaws.

IN FIGURE I. which represents the head of an old man, the skin of the neck is dissected off, and cut away, nearly in the line of the Jaw Bone; so as to show, (*a*) the Jaw Bone; (*b*) the Parotid Gland, lying behind the angle of the jaw; (*c*) the Submaxillary Gland, lying under the corner of the jaw; (*d*) the Great Carotid Artery, which carries blood to the head; (*e*) the Great Jugular Vein, by which that blood is returned; (*g*) is the Thyroid Gland, which consists of two lobes, one lying upon the right side of the Trachea, the other upon the left side, the two lobes are joined by a narrow slip of the Glandular substance which lies upon the fore-part of the Trachea, and is called the ISTHMUS, *i. e.* neck betwixt the two lobes, joining together the two lobes of the Gland. The Gland is large, where the bulk of it can lie at either side of the Trachea; but its Isthmus marked (*g*) is very thin, and almost membranous, where it lies upon the fore-part of the Trachea. We find the Gland smaller in men, larger in women; of great variety in respect of size; very generally so large, as to be distinguished by the fingers on the outside of the throat; very often enlarged, and often descending deep behind the Trachea, so that the two opposite lobes almost meeting behind, surround that Tube, and explain to us how terrible and how incurable (by any operation at least), that suffocation must be, which proceeds from a swelling of this Gland. This form of the Gland almost surrounding the Trachea, the two opposite lobes nearly meeting behind, is better explained in the Trachea, drawn at Figure vi. Plate ii.

The parts of the Trachea, with which the muscles are more immediately connected; are,

(1.) The Os Hyoides, which lies in the root of the tongue.

(2.) The Thyroid Cartilage, where it projects to form the Pomum Adami.

(3.) The Cricoid Cartilage, which is above the Thyroid Gland. Therefore the Thyroid Gland is hardly entitled to the name of THYROID, since, in place of resting upon the Thyroid Cartilage, it lies quite below both the Thyroid and Cricoid Cartilages, upon the first, or rather upon the second ring of the Trachea.

THE MUSCLES ARE THESE,

(137.) is the STERNO MASTOIDEUS, the great muscle of the neck; thrown back to expose those smaller muscles which belong properly to the throat; and there is seen,

(34.) The STERNO-HYOIDEUS, coming up from the Sternum, going upwards to the Os Hyoides, long, flat, ribband-like, and bending where it passes over the Thyroid Gland.

(35.) The STERNO-THYROIDEUS, coming also upwards from the Sternum; stretching towards the Thyroid Cartilage; lying under the last named muscle; like it flat and ribband-like; covering also the Thyroid Gland, and bulging a little where it passes over the chief bulk of the Gland.

(36.) The OMO-HYOIDEUS, coming upwards from the shoulder. It is a digastric or two-bellied muscle. The belly (36.) is fixed into the Os Hyoides. The middle tendon (*h*) is seen under the Mastoid muscle; and the lower fleshy belly lies too deep to be seen, for it rises from the Scapula near the Coracoid Process.

These are the chief muscles which pull the throat downwards.

The muscles which pull the throat upwards are the MYLO-HYOIDEUS, the BIVENTER, and the STYLO-HYOIDEUS muscles.

(37.) The MYLO-HYOIDEUS arises from the whole length of the Jaw Bone, from the chin to the angle; and it arises not from the lower border of the jaw; but rather from the inner surface of the jaw-bone, almost as high as the sockets for the teeth. It is thick and fleshy; but still it is flat and broad; and goes downwards in a radiated or fan-like form, to be implanted into the basis of the Os Hyoides. Within this muscle lies hidden the Genio-Hyoideus; without, lies the fore belly of the Digastric Muscle; the Sub-maxillary Gland (*c*) is an external Gland, and lies under the corner of the jaw without, (*i. e.*) over the Mylo-hyoideus; the Sublingual Gland is an internal Gland which lies under the tongue beneath this muscle. The Mylo-Hyoidei muscles of opposite sides are united to each other by a rapha or tendinous seam or line, which is seen at (*i*), and

and which goes down from the centre of the chin to the centre of the Os Hyoides.

(40.) The BIVENTER MAXILLÆ INFERIORIS belongs after all more properly to the throat than to the jaw; it is called Biventer from its two bellies, which are indeed very distinct and beautiful; one belly (*k*) arises from the root of the Mastoid Process, and so is seen here coming out from under the Parotid Gland; the fore-belly (*l*) is seen arising from under the chin; the middle tendon has the number of the muscle (40.) put upon it at that point where it passes the side of the Os Hyoides, and there it is attached to the Os Hyoides, not merely by running through a sort of Cartilaginous loop on the side of that bone, but also by running through a loop made by the flesh of the Stylo-Hyoideus muscle, which forks at its insertion.

(39.) Is the STYLO-HYOIDEUS coming from under the Parotid Gland, and implanted into the side of the Os Hyoides, and so binding down the middle tendon of the digastric muscle.

In this drawing then, are seen the chief muscles which affect the general position of the throat, *viz.*

1. The Sterno-Hyoideus (34.), Sterno-Thyroideus (35.), and the Omo-Hyoideus, (36.) pulling the throat downwards.
2. The Mylo-Hyoideus (37.), the Stylo-Hyoideus (39.), and the Digastricus (40), pulling the throat upwards.

One small muscle remains to be explained; it is the Crico-thyroideus (42.), which arises from (3.) the Cricoid Cartilage to be inserted into (2.) the Thyroid Cartilage.

## FIGURE II.

Is the head of a woman, the neck long, the slender muscles of the throat much dissected and thrown out, very loose and flaccid; and the Thyroid Gland was in this subject particularly large, hung very low down, and made a considerable bending in the two long muscles which run over it. This drawing is a freer dissection of these muscles, where all the anatomy of the throat is seen, for the Parotid Gland, the Carotid Artery, the Jugular Vein, the eighth pair of Nerves, and the chief Muscles both of the throat, and of the tongue, are here.

The Jaw Bone is here, as in the former figure, marked (*a*); the Parotid Gland (*b*); the Carotid Artery (*d*); the Jugular Vein (*e*); and the Thyroid Gland, which appears only at two points, and almost covered by the Muscles, is marked (*g*). But the most important parts in the anatomy of the neck, are the Carotid Artery (*d*); the Jugular Vein (*e*); and the Par Vagum, or eighth pair of nerves

nerves (8.) This eighth pair is a long nerve, which goes from the head down to the stomach to end there. It is marked (8.); it is seen here, lying upon the great Jugular Vein, which is turgid with blood, and bulging out in the form of a dilated intestine: the eighth pair of nerves goes down along with the Carotid Artery and Jugular Vein, they being all inclosed in one common sheath of Cellular Substance, which is here dissected away, to shew these parts clean.

The Os Hyoides is marked (1.); the Thyroid Cartilage is marked (2.); the Cricoid Cartilage is hidden by the muscles.

In this drawing, the Sterno-mastoideus (137.) is very fully dissected, is made flaccid, and is laid to one side, so as to shew the muscles of the throat freely; which for the sake of a clear demonstration, I shall divide into three sets. 1. The muscles from the Sternum, which pull the throat downwards. 2. The Digastric and the Styloid Muscles, which pull the throat upwards. 3. The muscles which make the flesh of the tongue, the chief part of its bulk.

I. The muscles coming upwards from the Sternum and shoulder are,

(34.) The Sterno-hyoideus, which is seen in all its length, stretching from the Sternum to the Os Hyoides, and bending over the Thyroid Gland.

(35.) The Sterno-thyroideus; exactly like this, lying behind and under it, proceeding from the Sternum to end in the Thyroid Cartilage, and also bending over the Thyroid Gland.

(41.) Is the place where the Sterno-thyroideus ends; and the Thyro-hyoideus begins; this (41.) then, is like a continuation of the same muscle, while it is really a distinct one, named THYRO-HYOIDEUS (41.) because it goes from the Thyroid Cartilage, to the Os Hyoides.

(36.) Is the OMO-HYOIDEUS, of which the fleshy belly is marked, as in the other drawing (36.) while its middle tendon is marked (*h*).

II. The muscles which pull the throat upwards are,

(40.) The Digastricus, of which the first belly (40.) is seen coming out from under the Thyroid Gland, while the fore belly (*n*) being cut away from the chin, hangs down.

(39.) The Stylo-hyoideus muscle, which is seen turning over the tendon of the Digastricus, and tying it down in its place.

(53.) The Stylo-pharyngeus, which lies very deep behind the other Styloid Muscles, passes down under the arm or branch of the Os Hyoides, and expands upon the Pharynx.

*N. B.* In

*N. B.* In this drawing, the Styloid Muscles are dissected upwards very nearly to that point (under the Parotid Gland,) were they rise small and delicate, from around the roots of the Styloid process.

III. The muscles which compose the chief bulk of the tongue, are these,

(58.) The Stylo-glossus, which comes small and delicate from the root of the Styloid Process; expands as it goes towards the tongue, and whose office is to pull the tongue down into the mouth.

(59.) The HYO-GLOSSUS, which I have represented as one single flat muscle, rising from nearly the whole length of the Os Hyoides.*

(60.) Is the GENIO-GLOSSUS, so named from its rising from that point of the lower jaw bone (*o*), which is called the chin; its fibres go into the tongue in a radiated form, in every direction, capable of performing all kinds of motions, of lolling the tongue out, and also of retracting it again; whence this muscle has by way of pre-eminence been named Musculus Linguæ Pollychrestus. And (*r*) is the tongue itself, composed chiefly of these muscles, and covered with its membrane.

The Genio-hyoideus (38.) is a muscle rising from the same point (*o*), of the chin; is implanted into the Os Hyoideus. This muscle which rises from the point of the chin only, lies under the Mylo-hyoideus (37.) (*vide* Figure i.) which rises from the whole length of the jaw; and these together pull the Os Hyoides, and of consequence the throat upwards.

So that there is seen by these two drawings, first, how the Mylo-hyoideus, (37.) figure i. and the Genio-hyoideus, (38.) figure ii. pull the throat upwards. Secondly, how the Digastric Muscle (40.) and the three Styloid Muscles, figure ii. pull the throat upwards and backwards. Thirdly, how the Sterno thyroidei, Sterno-hyoidei, and Omo-hyoidei, pull the throat downwards. And it is lastly very plain, that these at the same time that they are properly muscles of the throat, are occasionally muscles of the lower jaw, the only ones indeed which pull it down; little force is needed for this, the jaw dropping almost by its own weight; but, as the motion must be quick and voluntary, it must be done by muscles; and when the muscles from the Sternum fix the throat or pull it down, the Genio-hyoidei, Mylo-

* From its arising in three fasciculi or distinct bundles, *viz.* one from the basis, one from the horn, and one from the Cartilage of the Os Hyoides, it has been called the Basio-chondro-cerato-glossus, or each fasciculus has occasionally been described, as a distinct muscle.

hyoidei

hyoidei and Biventer depress the jaw; so that the motions of the jaw and throat, or in other words, the action of chewing and swallowing have this consent, that they are partly performed by the same common muscles, so that we cannot chew and swallow at once; the jaw which moves in chewing the morsel, must be fixed when it is to be swallowed; and so the motions for chewing and swallowing alternatively succeed each other.

PLATE

Published for Longman & Rees 1804.

# PLATE IV.

*This and the two following Plates explain the Text Book, from Page 232 to Page 285.*

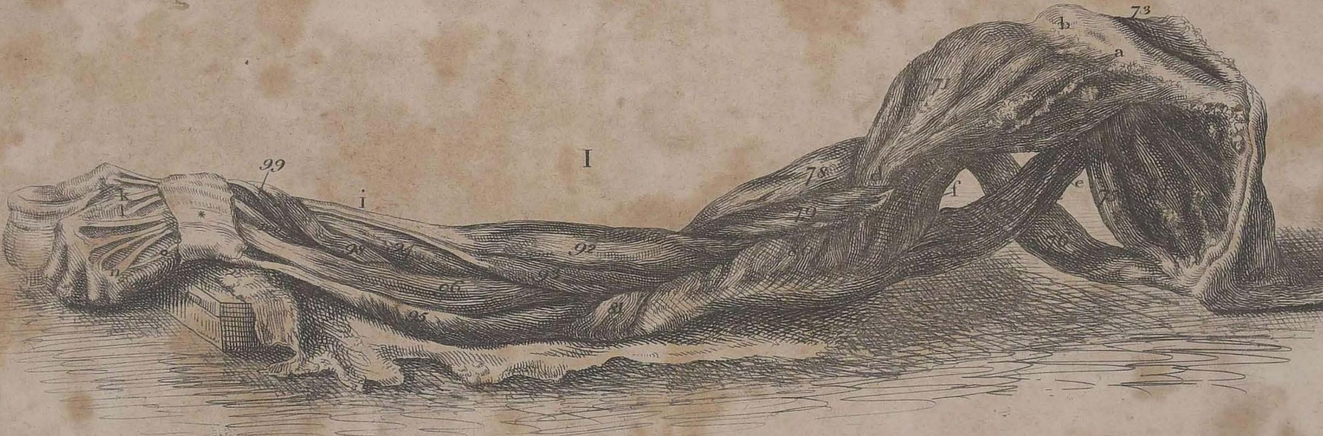
THIS plate explains those broad muscles, which belonging to the Scapula, lie flat upon the back, covering the whole of the trunk, and which are very remarkable in beautiful statues. The muscles are chiefly the TRAPEZIUS, and the LATISSIMUS DORSI; and this drawing is not so much of value as a piece of Anatomy, as in explaining to the student the first appearance of his dissection of the back; and by explaining the great muscles of the Scapula, it marks a good beginning for the Anatomy of the arm.

THE TRAPEZIUS MUSCLE, (62) "is one of the most beautiful muscles of "the body, of a Lozenge-like form. Covers all the back and neck quite "round to the fore-part of the shoulder; the two muscles extend from "the tip of the one shoulder, to the tip of the other, and from the "nape of the neck quite down to the loins." The strong middle tendon by which the two muscles of the opposite sides are connected, is marked (*a*) the insertion into the Occiput is marked (*b*), and the insertion into the spine of the Scapula, is marked (*c*).

"The LATISSIMUS DORSI, (70.) it is the broadest not only of the back, but "of the whole body, covering all the lower parts of the back and loins." Its broad, flat, and glistening tendon is marked (*d*), the chief belly of the muscle is marked with its number (70); the place where its fibres cross is marked (*e*), and it then runs under the arm into the deep shadow, being implanted into the arm bone to pull the arm backwards.

The DELTOIDES (71.) next appears, the skin being thrown down carelessly, so as to show where this muscles rises from the Spine of the Scapula; and especially its origin is seen; for it rises from the Spine of the Scapula (*c*), and in part from that line of the Scapula into which the Trapezius Muscle is inserted.

A small part of the TERES MAJOR, (76.) is seen in the space betwixt the Deltoides, and the Latissimus Dorsi; a small part of the INFERA-SPINATUS, (74.) is seen lying upon the Scapula, under this (the back) part of the Deltoid; and also a small part of the Rhomboides, (65.) is seen under the edge of the Trapezius Muscle. Upon the haunch, the upper part of the great Gluteus Muscle (163.) is seen uncovered by the skin, which hangs like a scroll over the edge of the table.




I

II

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Etched by J. Bell

# PLATE V.

*This Plate with the* IV. & VI. *explains the Text Book, from Page* 232, *to Page* 285.

THIS plate shows the arm in that posture into which it naturally falls, when thrown out upon the table, *viz.* standing upon the lower angle of the Scapula, the shoulder joint raised, and a little supported, the elbow touching the table, the fore-arm lying flat along the table, the wrist raised by the box of knives thrust under it, and the hand dropping over the box, so as to touch the table again, with the knuckles.

FIGURE I. describes the outermost layer of Muscles. Figure II. (a fuller dissection,) explains those which lie under, and contains every muscle quite down to the bone. The two drawings are explained as one, since they are indeed two drawings of the same arm in one posture; and the most natural arrangement for this explanation is, 1. Of the muscles lying on the Scapula, and moving the shoulder bone. 2. Muscles lying on the arm, and moving the Radius and Ulna, the two bones of the fore-arm, and 3. The muscles which lie upon the fore-arm, and which move the wrist, and fingers, and thumb.

## I. MUSCLES LYING UPON THE SCAPULA.

There is seen here, the part of the SERRATUS MAJOR ANTICUS Muscle, (66.) which lies upon the fore-part of the chest, which goes backwards under the Scapula, betwixt it and the ribs; and which is implanted, as is seen here, into all the line of the Basis of the Scapula, to pull it forwards. The place where the SUPRA-SPINATUS (73.) lies, above the Spine, is seen filled with its muscle in the upper drawing, and the place of that muscle is seen empty, and with only naked bone in the lower drawing.

The

The INFRA-SPINATUS, (74.) is seen both in the upper and in the lower drawing covering all that part of the Scapula, which is below the Spine.

The TERES MINOR, (75.) is seen both in the upper and in the lower drawing lying in its place not much dissected, and so little separated from the Infra-spinatus (74.) that it looks rather like a particular fasciculus of that muscle, as indeed it is; but though the Teres Minor is not in its fleshy belly easily distinguished from the Subscapularis, yet it has its tendon very distinct.

The TERES MAJOR, (76.) is neither like the Teres Minor, nor is it round as its name imports, but is a large, flat, and long muscle which comes along with the Teres Minor, from the angle of the Scapula, and being here fully dissected, and hanging flabby, it is seen, that it twists under the shoulder bone, and is implanted, not like the Teres Minor, which goes into the knob on the outside of the head of the shoulder bone; but low down, and upon the shaft of the bone, almost as low as the insertion of the Deltoid Muscle; so that the shoulder bone is embraced betwixt the two Teretes Muscles, even in the natural condition of the parts: and in the aukward twistings of a luxation, the head of the bone is often closely embraced and strangled, as it were, betwixt the two Teretes muscles, and not unfrequently under the subscapularis; an accident which makes the bone more difficult to reduce; but very often the joint is not at all embraced by the muscles, but is quite loose and moveable, and its being easily reduced, is rather perhaps to be considered as a sign of the joint being much hurt and all these muscles torn away.

(71.) Is the DELTOIDES, the last muscle which proceeds from the Scapula on this side of the arm. It is seen here rising from the Spine of the Scapula (*a*), from the tip of the Acromion Process (*b*), and also it has an origin from a part of the clavicle. It is seen here implanted in the arm bone at (*d*), about one third down. In the upper drawing it lies in its place; in the lower drawing it is cut up and turned backward, to show the head of the bone, and the insertion of the Teres Minor.

But there are still two other muscles which rise from the Scapula to be implanted into the arm bone, *viz.* the SUBSCAPULARIS, (77.) and the Coraco-brachialis, (72.) which are both seen in the next plate.

II. The Muscles moving the fore-arm, and which lie upon the arm, are the Triceps and Anconeus behind, and the Biceps and Brachialis Internus before.

The Triceps (80.) was once described as three muscles, but is now accounted as one muscle, having three heads; (*e*) the first, a long head, which rises from the lower edge of the Scapula, near the Glenoid Cavity; and, coming down betwixt the Teres Major, and the Teres Minor Muscles (75.) and (76.)

meets

meets the second head which is shorter; for the second head of the Triceps (*f*), rises from the shoulder bone, a little below the head of the bone, and takes a long origin from almost the whole length of the humerus. In these two drawings, the first and second head only of the Triceps is seen; but in the next plate, the third or shortest head (*g*) of the Triceps is seen coming rather from the inner side of the bone, and lower down.

The ANCONEUS, (81.) or Muscle of the Elbow, is a small muscle not very easily found nor understood. It lies exactly upon that part of the elbow on which we rest in leaning upon the arm. It is seen in the upper drawing only, and is marked with its number (81).

(78.) The BICEPS, the Thick Muscle of the fore part of the Arm, is seen in the upper figure. But the middle of its belly only is seen; its heads lying under the Deltoid Muscle. The BRACHIALIS INTERNUS, (79.) which lies under the Biceps, is seen in the upper drawing, but it is better seen in the lower drawing and the manner of its rising from the fore part of the shoulder-bone is tolerably well expressed. Neither of the heads of the Biceps can be seen in the upper drawing, because of the Deltoid Muscle; but in the lower drawing, where the Deltoid is cut up from the Scapula, and reclined backwards, the longer head of the Biceps is seen raised upon the blow-pipe, (*h*) which is passed under it just where the tendon is coming out from the Capsule of the shoulder joint; for this head of the Biceps is a long and slender tendon, which comes from within the cavity of the shoulder joint, and goes down under the belly of the Deltoid Muscle, being tendinous quite to the middle of the arm.

The muscles of the FORE ARM are arranged in my description of the Muscles under two classes.

I. The Extensors of the wrist, fingers, and thumb, which all keep the outer round side of the fore-arm, arising chiefly from the outer Condyle.

II. The Flexors, or Benders of the wrist, fingers, and thumb, which lie all upon the inner flat side of the fore-arm, rising in their turn, chiefly from the inner Condyle. In these drawings the extensors only can be seen; in the drawings of the next plate all the flexors are seen.

To begin then with the Muscles lying upon the upper or radial edge of the fore arm, there is,

(92.) The SUPINATOR LONGUS RADII, which turns the palm of the hand up; for it rises from the shoulder bone, above the elbow joint, and goes down the fore-arm with a long flat tendon, which is marked (*i*) to be planted into the Radius at its fore-part.

(102.) The SUPINATOR RADII BREVIS, is a deeper Muscle, and therefore it is seen only in figure ii. where it is seen lying close upon the Inter-osseous Ligament, rising from the Ulna, going across to be inserted broad and fleshy

into

into the Radius, and turning the Radius upon the Ulna, so as to throw the palm upwards.

The two next muscles keep also very exactly to the Radial edge of the arm; belong to the wrist; are the extensors of the wrist on the Radial side of the arm; and are named Extensores Carpi Longior et Brevior.

(93.) The EXTENSOR CARPI RADIALIS LONGIOR, rises from the arm bone just under the place of the Supinator Longus (92.); has a strong fleshy belly like it; and its long tendon accompanies the long tendon of the SUPINATOR and is implanted near the root of the thumb, at (*k*), to bend the wrist back.

(94.) The EXTENSOR CARPI RADIALIS BREVIOR, rises also from the shoulder bone, but lower, and thence it is shorter; but it is in all other respects like the former; like it has a short thick fleshy belly; a long and slender tendon, running along the wrist, is implanted into the back of the hand, at the root of the fore-finger, at (*l*); and like the former it bends the wrist backwards.

These three muscles, the SUPINATOR, and the two extensors, form the chief flesh of the fore-arm just under the elbow joint, and the three bellies make three dimples and three curious swellings, which are drawn by the painter with great care, for they make the chief marks of the fore-arm; and the true drawing of the fore-arm (in its bendings and fore-shortenings, and especially in its strong exertions of pulling or grasping,) consists chiefly in the right placing of these three bellies, where they cover the joint; and it is the rising belly of the Supinator, which (in the drawing), joins the forearm rightly to the arm. These three muscles are seen lying in their places in the upper drawing, but flaccid. In the lower drawing, the SUPINATOR, (92.) is cut away, and the place, whence it was cut out from the arm-bone, is marked with its number (92.), while the long Extensor (93.) and the short Extensor (94.) are both left in their place; but they are much dissected, and allowed to hang over by their own weight to the inner side of the fore-arm, so that in this lower drawing their tendons are less perfectly seen.

(95.) The EXTENSOR CARPI ULNARIS seen in the upper drawing dissected very clean, lying loose and flabby, but yet not separated from the Ulna; whereas in the lower drawing it is so fully dissected, as to fall away from the Ulna, leaving the bone at (*m*) naked.

And so there remains of all the muscles on this side of the fore-arm, those only which extend the fingers and thumb; and they are all seen, in the upper drawing, dissected, but still in their places. In the lower arm they are all thrown loose.

(96.) The EXTENSOR COMMUNIS DIGITORUM is seen in the upper drawing thick and massy; covering the other slender muscles. This muscle goes to all the fingers,

by

by the tendons *(n n)* which are seen on the back of the hand. In the upper figure the Extensor Communis is in its place; in the lower drawing it is cut up, and thrown out upon the table.

(97.) EXTENSOR DIGITI MINIMI vel Auricularis is seen only in the lower drawing, for in the upper drawing it is covered by the Extensor Communis. It is like a slip of the Extensor Communis, and consequently it is cut up here along with the Extensor Communis.

The slender tendons of the Extensor Communis are marked *(n n.)* The slender tendon of the Auricularis is marked *(o.)* But the fore-finger also has a particular Extensor, which is named Indicator, and the thumb has three Extensors, named 1st, 2d. and 3d.

(98.) The EXTENSOR PRIMUS POLLICIS is the first upon the edge of the arm, passing obliquely over the Radius (99.) The EXTENSOR SECUNDUS is next to that; and the EXTENSOR TERTIUS (100.) is next to that again. These three Extensors are seen fully dissected in the lower drawing, hanging loose, and their slender tendons distinctly seen. In the upper drawing they are less dissected; and the manner in which the three tendons cross obliquely over the wrist, and the manner of their coming up to the thumb touching the great joint of it, is well explained. It is seen here that these tendons are bound down by the Annular Ligament (*); and by raising the thumb strongly in our own hand, we can compare it with this dissection, for we see the starting up of these tendons of the thumb, and we see at the same time the point distinctly marked at which the ring of the Annular Ligament holds them down.

The INDICATOR (101.) lies next to the Extensor Tertius Pollicis; it rises from the Ulna; its slender tendon goes up to the fore-finger to extend it. This muscle is seen only in the lower drawing. In the upper drawing all the muscles are in their natural places, the tendons being bound down by the Annular Ligament which is marked (*). It is a tendinous expansion, thin, flat, and ribband-like, and the muscles extending the fingers are seen through this transparent band. It is called the Annular, or Ring-like Ligament of the wrist.

PLATE

# PLATE VI.

*This Plate explains the Text Book, from Page 217, to Page 220.*

THIS plate explains all the flexor Muscles of the hand, wrist, and fingers, by a drawing taken when the arm was set up for the figures of the last plate, and consequently the postures are expressly the same; and the parts, as the SCAPULA, the CLAVICLE, and the position of the fore-arm must be easily understood.

THE Seratus Major Anticus (66.) is still seen hanging down from the basis of the Scapula. Part of the Supra-spinatus (73.) is seen above the Spine. Below the Spine is seen the Infra-spinatus.

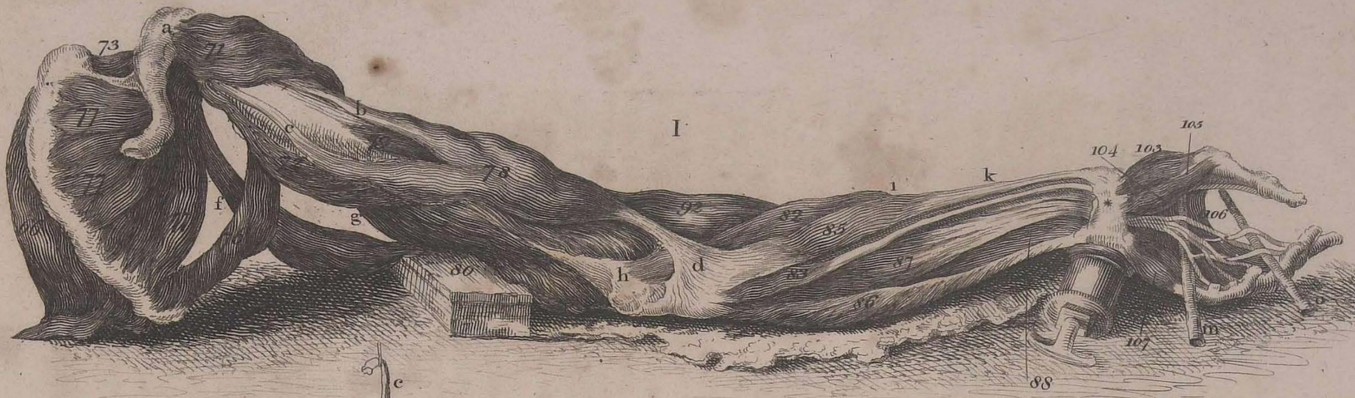
The SUBSCAPULARIS (77.) is seen filling the whole of the hollow of the Scapula, lying under the Scapula, betwixt it and the ribs.

The TERES MAJOR (76.) is seen here also hanging down flaccid from the place, where it is implanted into the shoulder bone.

That part of the DELTOIDES (71.) which rises from the Clavicle (*a.*) is seen here.

The BICEPS BRACHII (78.) is seen in the upper drawing with the belly marked (78), lying in its place. Its longer slender tendon which comes from within the shoulder joint is marked (*b*). Its shorter tendon which still is very long but thick and fleshy, is seen marked (*c*), coming from under the Deltoid muscle where it rises from the Coracoid Process. Its flat tendon, which expands upon the fore-arm, and strengthens the general fascia of the arm, is seen spreading out over the Muscles at (*d*), and the ragged edges of the fascia are seen lying out upon the Muscles, for the Muscles both above and below are dissected clean, while the fascia of the arm is left only at (*d*) that the connection betwixt this fascia and the Biceps tendon might be explained.

In the lower drawing the shorter head of the Biceps (*c*) is seen cut away from

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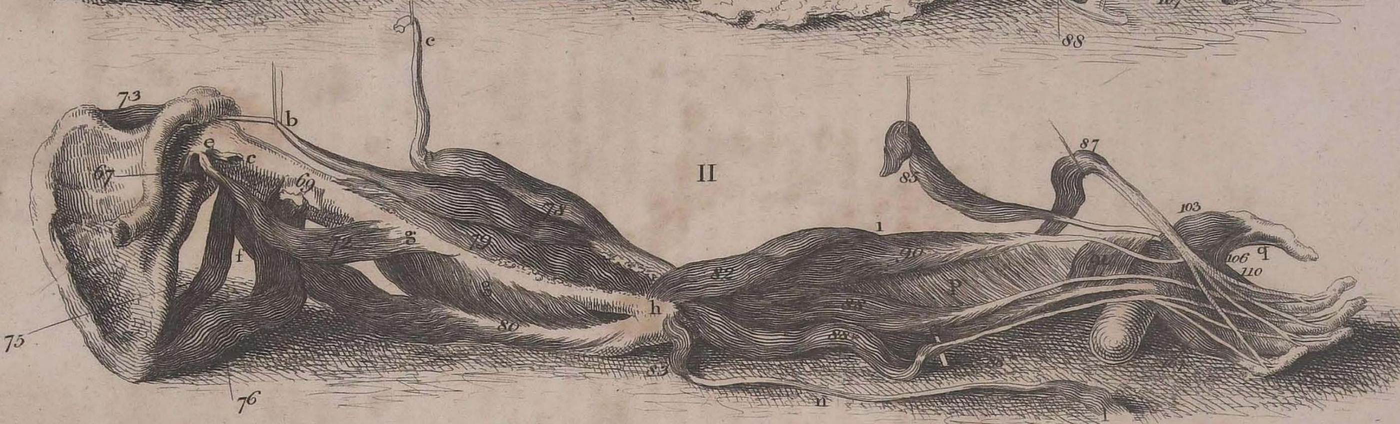


II

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from the Coracoid Process (*e*), and hung up by a string. The longer head (*b*) is pulled upwards by a string, that it may be seen how it comes from under the clavicle, where it rises within the shoulder joint. The Coracoid Process whence the shorter head arises is marked (*e*), and it is seen that there are three points of Muscles sticking to the apex of the process; for the little pectoral Muscle (67.) is implanted into it; and the CORACO-BRACHIALIS (72.) and this shorter head of the Biceps rise from it.

The BRACHIALIS INTERNUS (79.) is seen in both arms, lying under the belly of the Biceps, and rising from the bone.

The CORACO-BRACHIALIS (72.) is seen in both the drawings. In the upper drawing it is touched by the short head of the Biceps, which makes it less distinct. In the lower drawing the short head of the Biceps is tucked up. The Coraco-brachialis is fully dissected, and is left flaccid and hanging away from the arm bone; and its origin from the Coracoid Process (*e*) and its insertion into the middle of the shoulder bone at *g*) are both well seen.

Over the middle of the bending of the Coraco-brachialis there is seen the remains of a flat and broad tendon, (69.) sticking to the arm bone, which is the cut tendon of the great pectoral Muscle, which is implanted thus low upon the Os Humeri, to give it the advantage of a lever in pulling the shoulder bone inwards. I have used the mark (69.) of the pectoral Muscle to point out its tendon.

The TRICEPS (80.) is also well seen, especially two of its heads, viz. the longest head (*f*), and the shortest head (*g*), while the head which is of a middle length lies upon the back part of the bone, and cannot be seen in this view.

The Muscles of the FORE-ARM, *i. e.* all the Flexors of the hand, fingers, and thumb, are shown here; in the upper drawing, they are in their natural position, in the lower drawing, they are separated for demonstration, and some of them are hung out.

In the upper drawing the Muscles of the fore-arm are few and simple, lying regularly in their places; and so are easily understood.

One Muscle belonging to the outside of the arm is seen here, *viz.* the SUPINATOR RADII LONGUS, (92.) the belly of which is seen lying upon the Radial edge of the arm, above the elbow; the next to that is the PRONATOR TERES, (82.) It rises at (*h*), from the internal Condyle; is implanted into the Radius at (*i*), and turns the hand prone, *(i. e.)* flat down. It is called Pronator Teres, because it has a round fleshy belly, very opposite in shape to the Pronator Quadratus; for the PRONATOR QUADRATUS, (91.) which is seen

in the lower drawing is of a square form, lying flat upon the Inter-osseous Membrane, rising from the Ulna, implanted into the Radius, and having only one direct office, *viz.* that of turning the Radius.

The next Muscle to the Pronator Teres, is the FLEXOR CARPI RADIALIS, (85.) or the bender of the wrist, on the side of the Radius. Its head is covered in part by the expanding tendon of the biceps at (*d*); then the rest of the Muscle is naked; and its long tendon is seen as it goes along the Radial edge of the fore-arm marked (*k*).

The PALMARIS LONGUS, (83.) is a long, slender, and delicate muscle; it is merely a bender of the wrist; and comes by a small head from the inner Condyle of the Humerus, and its small tendon runs down the middle of the arm till it touches the Anular Ligament of the wrist, to be implanted into it. This Anular Ligament I have marked (*); but though it has the same mark with the Anular Ligament on the outside of the arm, it is not a continuation of the same Ligament, nor is it like it; but is a short, thick, and very strong ligament passing across from the Pisiform, to the Scaphoid bone of the Carpus. It is shorter and stronger than the Anular Ligament of the outside; it has a firmer origin from two particular bones, and has a deeper arch under it: for the tendons which it binds down are very numerous, and connected with much stronger muscles than those on the back of the hand.

The FLEXOR CARPI ULNARIS, (86.) lies along the ulnar edge of the arm; is a penniform or feather-like muscle, very fleshy; rises from the inner Condyle along with the Palmaris Longus, (83.) and is implanted by a strong round tendon into the projecting Pisiform Bone.

The FLEXOR DIGITORUM SUBLIMIS, (87.) is a very large thick bellied muscle. It is called Sublimis, because it is the outermost of the two flexor muscles. It is seen here lying in its place, thick and fleshy in its belly; its tendons passing under the arch of the Anular Ligament, appearing in the palm of the hand, to go to all the fingers; there are four distinct tendons, which are here supported upon a blow-pipe marked (*m*); and the place of the Flexor Profundus, which lies under, it is seen at (88.)

In the lower drawing, the muscles of the fore-arm are seen much freer and better.

The PRONATOR TERES (82.) is seen in its place, thick, round, and fleshy.

The PALMARIS LONGUS, (83.) is thrown out upon the table; by which it is seen how short and delicate its muscular belly is; how long, slender, and delicate its tendon (*n*), from which it has got its name. And the Palmar Apponeurosis, or tendinous web, (*l*), which covers the palm of the hand, and which like the palm is of a triangular form, is here cut up and left connected with its tendon.

The

The UPPER Flexor of the fingers, or FLEXOR SUBLIMIS, (87.) is supported by a ligature, so as to draw its four tendons nearly into a straight line, showing how they are split near the fingers, whence this muscle is often named PERFORATUS.

The deep Flexor, FLEXOR PROFUNDUS, (88.) is left at its origin. Its belly is raised and drawn out a little, and held extended by a pin; and the three tendons of this muscle are seen going through the loops, or splits of the tendon of the last muscle, whence this one is named Musculus Perforans.

These tendons of the Perforans and Perforatus are also well seen in the uppermost figure, where the perforating tendons are raised over the blow-pipe (*o*), and the perforated tendons are also supported upon another blowpipe (*m*).

The muscle marked (88*) which seems to go with a particular tendon towards the fore-finger, as if it were a particular Flexor for the fore-finger, is merely that head of the general Flexor which goes to the fore-finger, it is a part of the Flexor Profundus; and this particular appearance is produced merely by dissecting this belly a little too high up; for this muscle, and the Flexor Sublimis also, are divided or diviseable into four distinct bellies, for each of the four distinct fingers which they serve.

The FLEXOR LONGUS POLLICIS, (90.) is a large and strong muscle for bending the last joint of the thumb; its tendon is seen going in under the two short muscles of the thumb, and is seen again at (*q*) escaping from betwixt the short Flexors, and going forwards to the point of the thumb.

The PRONATOR QUADRATUS, (91.) is seen lying flat upon the Interosseous Membrane which is marked (*p*).

The muscles of the HAND are not fully explained, but yet the chief muscles are seen.

The ABDUCTOR BREVIS POLLICIS, (103.) is seen in the upper drawing rising from the outside of the Anular Ligament.

The FLEXOR BREVIS POLLICIS, (105) is seen rising also from the Anular Ligament. Another head rises deeper in the hand, but is not seen here, there is seen only the tendon of the long Flexor, passing betwixt these two heads of the short Flexo.

The OPPONENS POLLICIS, (104.) cannot be seen here, because it does not move any of the joints of the thumb. It belongs only to the Metacarpal bone of the thumb; and of course it lies under these two.

The ADDUCTOR POLLICIS, (106.) or, that which carries the thumb towards the fore-finger, is also seen here; but so much under shadow, that it is not to be distinguished from the ABDUCTOR INDICIS, (110.) For the Adductor Pollicis and

Abductor Indicis lie close upon each other, and are of the same flat and triangular shape.

The muscles of the little finger are, the Abductor and the Flexor Minimi Digiti; but it is the ABDUCTOR MINIMI DIGITI (107.) only that is seen here, lying on the edge of the palm, under the little finger; which we feel acting, when we spread wide the little finger, or when taken with that slight cramp which we often feel upon the lower edge of the palm.

PLATE

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# PLATE VII.

*This Plate explains the Text Book, from page 235, to page 310.*

THIS Plate represents the Trunk of the body in various drawings; explaining those muscles of the Scapula, which lie flat under the Trapezii Muscles; also the serrated muscles, which raise or depress the ribs in breathing; the LONGISSIMUS DORSI, and Sacro-Lumbalis, the chief muscles which support the Spine; and it also explains the Intercostal Muscles; the Levators of the ribs; the lesser muscles of the Neck and Spine; and the RECTI CAPITIS, the small nodding muscles of the head.

IT explains a set of muscles, which are found in the book from page 235, to page 310. From page 235 of the book, forwards, are explained the chief muscles of the Scapula; as the Levator Scapulæ, the Rhomboid Muscles, and the Serratus Anticus; and these three are the chief outermost muscles in the dissection represented in Figures i, and ii.

The LEVATOR SCAPULÆ, (63.) is seen in Figure I. on both sides, rising from the Transverse Processes of the upper Vertebræ of the neck, and going downwards to be implanted in the upper corner of the Scapula, whence it is named Musculus Angularis Scapulæ.

The RHOMBOID Muscles, (64, and 65.) are two flat muscles which come with a thin flat tendon from the Spines of the neck and back, and are implanted quite fleshy, but still thin and flat, into the whole length of the basis of the Scapula. The division betwixt the cervical portion of this muscle, (64.) which is the RHOMBOIDES MINOR, and the larger portion coming from the Spines of the back, and which is named RHOMBOIDES MAJOR, (65.) is very slight.

Part of the INFRA SPINATUS, (74.) is seen here; the DELTOIDES, (71.) is also seen; the SERRATUS MAJOR ANTICUS, (66.) or great muscle for moving the Scapula forwards, is seen lying upon the side of the chest, rising from the ribs to pass under the Scapula, where it is implanted into the whole length of the basis of the

the

the Scapula, exactly opposite to the insertion of the Rhomboides. But in Figure II. the Serratus Major Anticus is represented again lying under the Scapula; and the Scapula, to show it, is cut almost away from the trunk, and is thrown out into a very unnatural position, and the confluence of the separate heads or Serræ by which this muscle rises from each of the ribs is indistinctly marked.

Thus the SERRATUS ANTICUS is seen to be a muscle belonging to the Scapula; but the SERRATI POSTICI, (113. 114.) are muscles of the ribs belonging chiefly to respiration, and they are seen in Figure I. and these muscles of the ribs are explained in the book from page 285, to page 290. The upper Serrated muscle lies flat under the RHOMBOIDES; the lower Serrated muscle lies in like manner flat under the Latissimus Dorsi muscle; but they cover the LONGISSIMUS Dorsi and SACRO-LUMBALIS muscles, the lower Serratus covering their fleshy bellies, and the uppermost covering their tendons.

The SERRATUS SUPERIOR POSTICUS (113.) is seen lying flat upon the side of the neck; on the right side the RHOMBOIDES covers it; on the left side it is seen naked. It begins by a neat flat shining tendon, resplendent like the colours of a fish turning in the water; and this flat tendon (which is exactly like the flat tendon of the Rhomboid muscle) comes from the three lower Spines of the neck, and divides into three neat small fleshy heads which are marked (*a a*), and these are implanted into three of the ribs; and by raising three ribs it is plain that they must raise the whole chest.

The SERRATUS INFERIOR POSTICUS (114.) is the exact antagonist of this, and exactly like it in all respects, only that it goes obliquely from below upwards, to pull the ribs down. It arises by a silvery shining tendon like the upper one; the tendon is very strong, but thinner than a sheet of paper. It ends in three heads, which are thin flat slips of flesh, inserted into three or four lower ribs a little beyond their angles.

The LEVATORES COSTARUM, (115.) are concealed by these muscles, but are seen in the next dissection, Figure II. where they are seen to be in number twelve pairs corresponding with the number of the ribs. The nine uppermost are seen to be short; the three lower pairs are seen to pass one rib, and to take hold on the rib below. Whence they are named LEVATORES COSTARUM LONGIORES.

The Levatores Costarum are these twelve distinct muscles, rising from the transverse process of each vertebra, and going down to lay hold on each rib; and so they lie flat upon the outsides of the ribs, and keep close to the Spine, and are short. But there are besides regular plans of fibres lying in the interstices of the ribs, which go from the edge of one rib to the edge of another, and fill up the space betwixt the ribs, and hence are named INTERCOSTALS. The internal intercostals exactly resemble the external intercostals. The external intercostals

tercostals only can be seen here, and they are seen best in the left side of Figure ii. marked (116.) the three lower internal intercostal muscles lying upon the three lower ribs are longer than the others, just as the lower Levators are longer; but it is not so in the outer layer of intercostals which (except in a few straggling fibres) are all of equal length.

The muscles which raise the trunk from the stooping posture, and especially the QUADRATUS LUMBORUM, SACRO-LUMBALIS, LONGISSIMUS DORSI, TRANSVERSALIS COLLI, and CERVICALIS, are explained from page 297, to page 301. and they are all pretty distinctly marked in Figures i. and ii.

In Figure I. the LONGISSIMUS DORSI (126.) and the Sacro-Lumbalis (127.) are seen only in the middle of the back; for they are covered by the Rhomboid and Serratus superior muscles above, and in the same way by the Serratus inferior Posticus below; but in figure ii. the three great muscles of the Spine, *viz.* the QUADRATUS LUMBORUM (125.) the LONGISSIMUS DORSI (126.) and the Sacro-Lumbalis (127.) are seen quite uncovered, and in their whole length; for their tendinous origin in the loins at (*b*), their middle bellies at (126, 127.) and their long tendinous insertions at (*c*), are all distinctly seen; and also their connection with the CERVICALIS DESCENDENS (128.) is explained.

The QUADRATUS LUMBORUM, (125.) which is cut away on the right side, is seen distinctly on the left side, arising big and fleshy from the Spine of the Ilium, and inserted partly into the transverse processes of the loins, but chiefly into the lowest rib.

The common tendon of the Longissimus Dorsi, and of the Sacro-Lumbalis, is seen at (*b*); it is a firm, thick, and strong origin, which is thus entirely tendinous without, but fleshy within; it rises from the SACRUM, ILIUM, and transverse processes of the Vertebræ, and fills up all the hollow upon both sides of the Spine.

The belly of the SACRO-LUMBALIS (127.) parts from the belly of the LONGISSIMUS DORSI, (126.) at the top of the loins, nearly opposite to the lowest rib.

The Longissimus Dorsi keeps closer by the Spine, and is inserted by a double row of tendinous feet; but they lie so under its own belly, and under the belly of the Sacro-Lumbalis, that they are hidden from the view. The tendinous feet of the SACRO-LUMBALIS are well seen, spreading out wider from the Spine and attaching themselves to the ribs; and these tendons marked (*c c*) are seen in figure i. lying flat and regular, each in its right place; but in figure ii. they are more dissected, are torn up a little from the flat surface of the ribs, and hang somewhat loose and flaccid. On the right side of the neck is seen the CERVICALIS DESCENDENS, (128.) rising from the transverse processes of the neck, going down to be implanted tendinous into the back, (*i. e.*) into the ribs. The Cervicalis is inserted under the upper tendons of the Sacro-Lumbalis, and the

the Longissimus Dorsi, on the other hand, is seen to send a delicate slip of tendon up into it; so that the Cervicalis seems equally connected with both of these muscles, but it is rather more beholden to the Longissimus Dorsi, for this slip; while the accident of the Cervicalis rising under the tendinous feet of the Sacro-Lumbalis makes hardly any connection.

On the left side again there is seen, the TRANSVERSALIS COLLI (129.); which rising from the Transverse Processes of the back, ascends towards the Transverse Processes of the neck; it is rather strong and fleshy, has little connection with any other muscle; the Cervicalis Descendens lies under it, while this the Transversalis is in its turn covered by the Splenius and Complexus*.

The rising slip of the Longissimus Dorsi has led to this explanation of the Transversalis, and of the Cervicalis Descendens; but naturally before these, there should have been explained the two larger muscles which cover them, *viz.* the Splenius and Complexus, which are best seen in figures i. and iii. In figure i. are seen, the SPLENII (118.) straight and flat, lying along the side of the neck, like the legs of the letter V. and in the interstice or place of their

* There are three slender muscles in the neck, which are in danger of being confounded, *viz.* the TRACHELO-MASTOIDEUS, the TRANSVERSALIS CERVICIS, and the CERVICALIS DESCENDENS. It is impossible to give a perfect drawing on so small a scale, nor indeed is it possible by any drawing, to represent them so that they shall be easily found, and distinguished; perhaps they will best be found by following this order of dissection. 1. The Trapezius and the Rhomboides, the two large flat external muscles belonging to the Scapula, are to be cut away; and then the Serratus Superior where it covers the lower part of the Complexus is to be raised. 2. The Splenius and Complexus are to be dissected and laid aside; and 3. the Trachelo-mastoideus, and the two other muscles come into view. Of these, FIRST, there lies immediately under the Complexus the Trachelo-mastoideus, large and fleshy, rising from the Transverse Processes in the back and lower part of the neck, by tendinous and fleshy feet, and going obliquely upwards and outwards till it is implanted fleshy into the Mastoid Process; and though it is more fleshy than the two muscles which come next, it still is so much a mixture of tendon and flesh, as to be named the Complexus Minor.—SECONDLY, There is the TRANSVERSALIS CERVICIS, which lies immediately under the Trachelo-mastoideus, keeps close to the Spine, *i. e.* lies in the hollow by the side of the Spinous Processes. It rises from the Transverse Processes of the back to be implanted in the Transverse Processes of the neck; is immediately covered by the Trachelo-mastoideus; and covers in part the Cervicalis Descendens.—THIRDLY, there is the CERVICALIS DESCENDENS, which lies more to one side than the Transversalis Cervicis; it therefore lies more properly under the Trachelo-mastoideus; its feet or tendinous origins begin from the tips of the Transverse Processes of the neck, just where the feet or small tendons of the Levator or Scapulæ begin; it is very slender and is a confused mixture of tendon and flesh, being chiefly tendinous, though it is fleshy in part. It is necessary to give this warning, that not even the largest drawing can make this piece of dissection perfectly easy; perhaps it may be the easier for this description and arrangement.

forking,

forking, is seen the chief belly of the COMPLEXUS, (119.) where it is implanted into the Occiput, lying under the Splenii. In figure iii. the Splenii are cut away, the Complexus only is seen, the chief belly of the Complexus where it is implanted into the Os Occipitis is marked with its proper number (119.) while its feet (partly tendinous and partly fleshy), by which it rises from the Transverse Processes of the neck and back, are marked (*e e*).

The muscles belonging exclusively to the Spine, are next seen in figure iii. for the chief of them are these two, First, the SPINALIS DORSI, (131.) or long muscle belonging to the Spinous Processes of the back. It runs along the whole back from spine to spine; it is very slender and almost entirely tendinous, and is marked with its number, (131.) Secondly, the MULTIFIDUS SPINÆ, (133.) which is a confused mixture of tendon and flesh, but thick and massy enough to fill all the hollow over the Oblique Processes of the Vertebræ, and betwixt the Spinous and Transverse Processes.

Three of the four small muscles which perform the quick turning and nodding motions of the head, are explained upon the head, figure iv. where the two small muscles called RECTI CAPITIS are seen dissected fairly, and laid over a blow-pipe; and here it will be observed that the two RECTI MINORES (121.) are smaller, and lie deeper betwixt the Atlas and the Scull; that the RECTUS MAJOR (122.) is not, as its name implies, a straight muscle, but is truly oblique. One of the Oblique muscles is also shown here, for there are two oblique muscles, somewhat like the Recti or straight ones. The Oblique Muscle (123.) which is here shown, is the Obliquus Superior, which rises from the Transverse Process of the Atlas, to be inserted into the Occiput. The Obliquus Inferior, which rises from the Dentatus to be fixed into the Atlas is here cut away, for only the Atlas is left in this Drawing.

*The drawings and plans which are numbered, VIII. IX. X. & XI. explain chapter vi. and vii. of the book, containing the Abdominal Muscles, the Diaphragm and the muscles of the Perineum. Plate VIII. gives a general view of the Abdominal Muscles, as they are first laid open. Plate IX. gives a second dissection of the Abdominal Muscles, showing the successive layers of the great Muscles which cover the Abdomen. Plate X. explains the general appearance of the Diaphragm, and its relation to the body. Plate XI. explains by plans and drawings, the Diaphragm and the muscles of the parts of generation.*

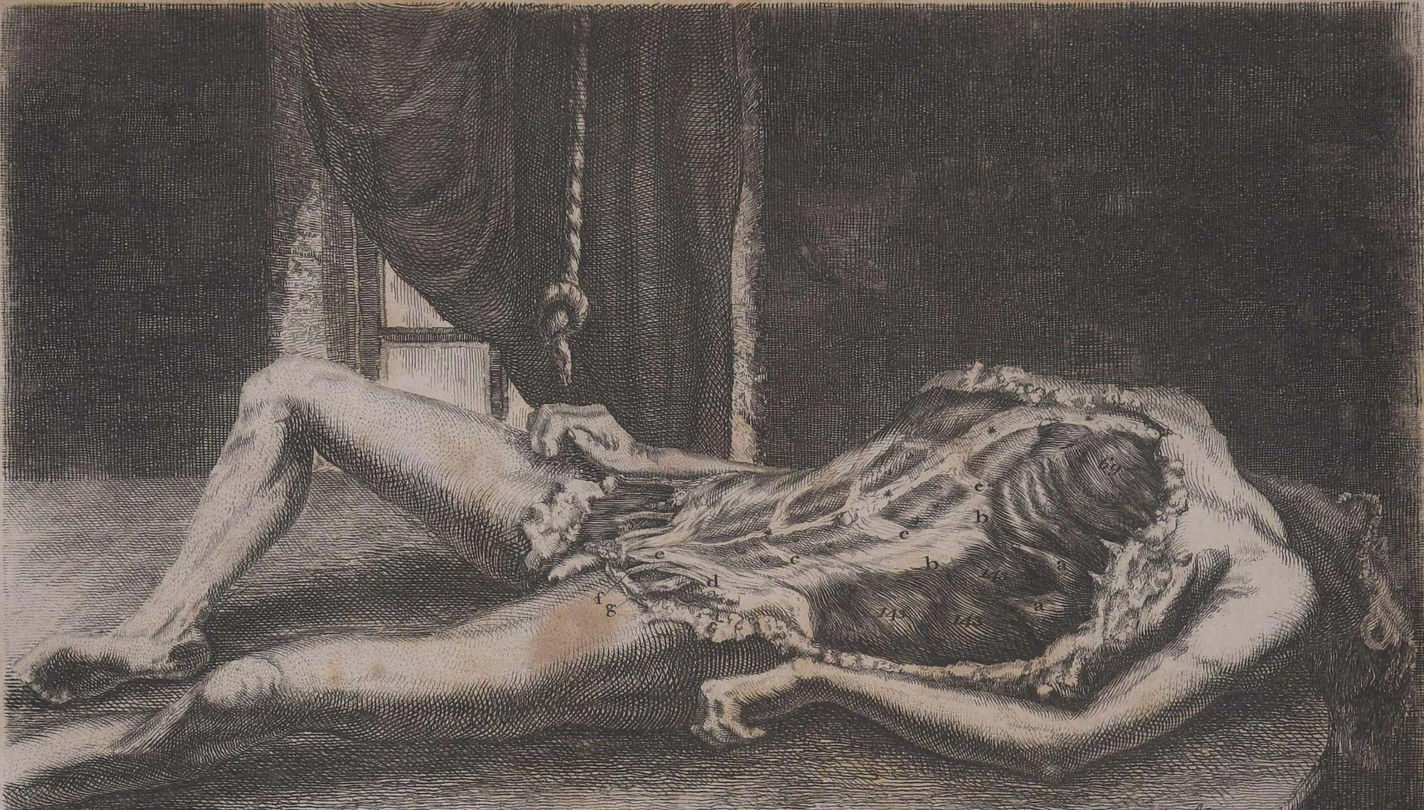
## PLATE VIII.

EXPLAINS the first dissection of the Abdominal Muscles in a lateral view; and the chief intention of the drawing is, to show the general appearance of the belly when uncovered of its skin; to show the great size of the Musculus Obliquus Externus, "and how it covers all the side with its fleshy belly, and all the fore-part of the Abdomen with its thin expanded tendon;" to explain the two great lines of marks, the Linea Alba, and Linea Semi-lunaris, and to show the ring of the Abdominal Muscles, and the ligament of the thigh in their true shapes, with the exit of the great arteries of the thigh, and the passage of the Spermatic Cord.

THE description then of these few parts needs not be tedious.

First, the great belly of the EXTERNAL OBLIQUE Muscle of the ABDOMEN is marked with its proper number (143.); and it is seen here how it covers the side, how it lies out upon the fore-part of the Thorax, and how it rises from the ribs by indigitations, which are marked so dark that they can be understood only by the indigitations (*a a a*) of the Serratus Major Anticus Muscle, in the interstices of which they rise.

The belly of this muscle covers only the side, stops suddenly at (*b b*), which represent the flat tendon, the fibres of which go obliquely from above downwards and inwards, where it is named OBLIQUUS DESCENDENS. The letters (*c c c*) show the line which is called LINEA SEMI-LUNARIS; and the letters are




MUSCLES PL. VIII.

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Engraved by J Bell

are so placed, as also to point out the intersections or tendinous lines which divide the Recti, or straight muscles of the Abdomen, into four or five distinct bellies; and consequently the letters (*c c c*) also mark the several bellies of the Rectus, shining through the thin expanded tendon of the External Oblique.

(*) Marks the head of the Rectus Muscle, where it rises from the border of the Thorax, touching the PECTORAL MUSCLE (69.) and at the place of this mark (*), the muscle is uncovered of its sheath; this mark serves also another use, for it is repeated again below near the navel, so that these two marks show the whole length of the LINEA ALBA, or white line, which is seen running down all the center of the belly from the Sternum quite to the Pubis, passing through the navel, and formed by the meeting of the tendons of all the muscles. And it is perhaps worth notice that the small holes marked very dark, which are neat, small, and round, and which appear in every dissection, like Oilet Holes, and are especially frequent over the surfaces of the Recti Muscles, are just the openings by which the great Cutaneous Veins of the Abdomen pierce the flat tendon of the External Oblique Muscle, to get to the bellies of the muscles which lie under it, or rather to come back from them, returning chiefly the blood of the Epigastric Artery†.

The tendency of the Oblique fibres of the Abdominal Muscle to split is easily seen, and the manner of its spliting to form the RING of the ABDOMINAL MUSCLES is faithfully represented, where (*d*) marks the lower pillar of the ring; (*e*) the upper pillar of the ring; and it is plain that (*d*) while it forms the lower pillar of the ring, is at the same time the Ligament of the thigh. (*f*) Marks the Spermatic Cord coming through the opening of the ring; (*g*) marks the femoral Artery coming from under Paupart's Ligament, or the Ligament of the thigh. Whence it will be understood how Bubonocele or Hernia of the Groin, following the course of the Spermatic Cord, will proceed obliquely inwards, and must (in attempting to reduce it), be pushed from within outwards: and how a femoral Hernia will by coming out from under the femoral Ligament, be lodged fairly in the thigh, far from the Groin; lying very deep, apt to be concealed from the Surgeon; and how by following the course of the great vessels of the thigh, the Femoral Hernia will proceed from within obliquely outwards, so that, in attempting to reduce this Hernia, we must push from without obliquely inwards.

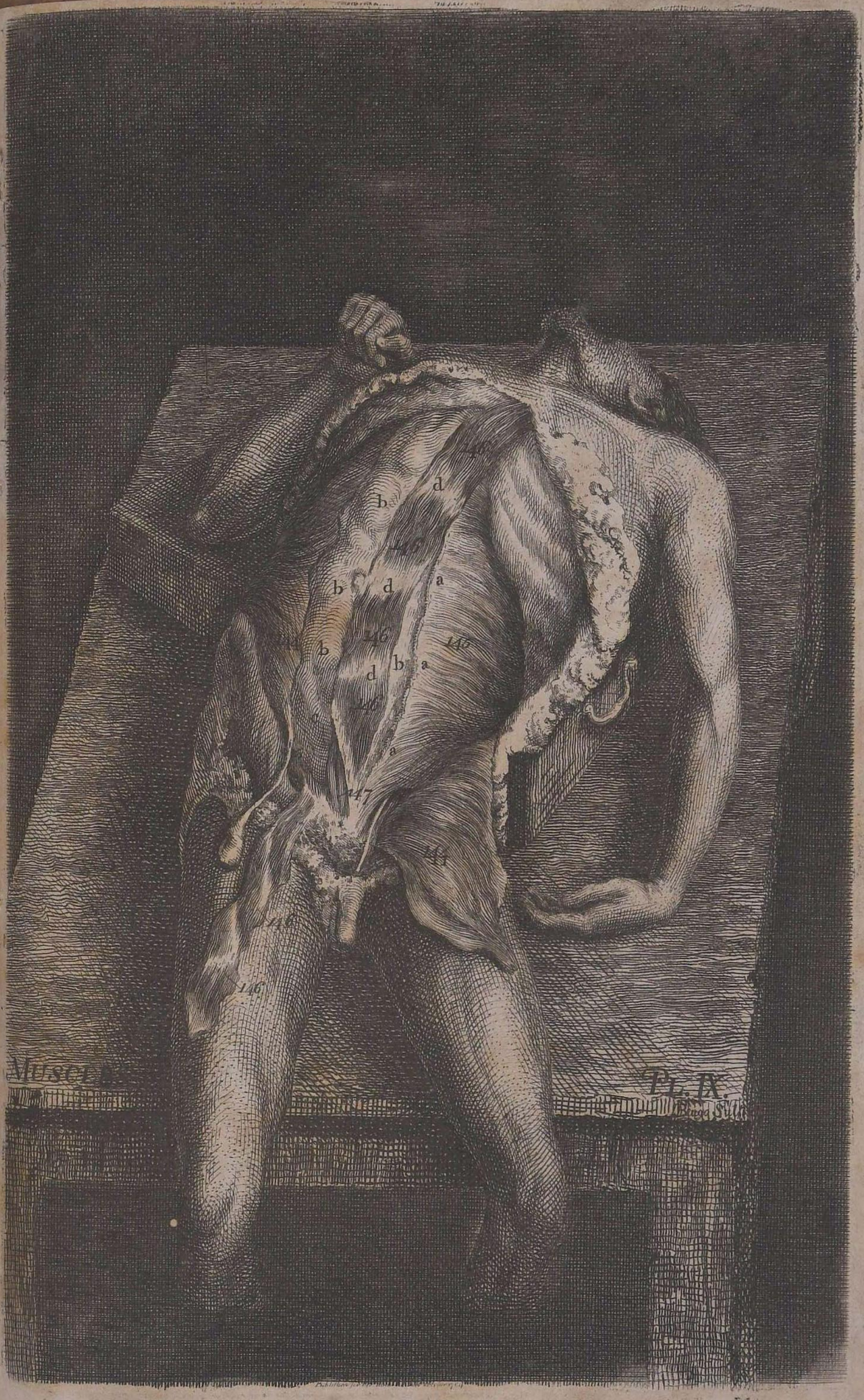
† I question whether it be not truly a wound of one of these large veins, (and they are greatly dilated in dropsy of the belly,) which occasions that kind of bleeding, which so often happens in tapping the belly.

## PLATE IX.

*This Plate along with the former explains the Text Book, from page 311, to page 323.*

EXPLAINS the second dissection of the belly; where the muscles being cut and thrown out upon the thighs, may seem irregular and confused, though it is truly the natural order and true appearance of the dissection. The view is not fore-shortened enough to make a pleasant drawing, because it was necessary to look from a high point, as in seeing a dissection from the seats of a Theatre, in order to have a full view of all the belly, from the Pubis to the Sternum.

1. The EXTERNAL OBLIQUE MUSCLE (143.) is entirely cut away, and no part of it remains on either side.
2. The INTERNAL OBLIQUE MUSCLE (144.) is seen on both sides; on the left side of the body it is cut up from its insertion, and is thrown down upon the thigh, showing chiefly how thick and strong its fleshy belly is; but on the right side of the body it is left in its place, were the obliquity of its fibres is well seen, and where the chief points of the description are fulfilled in the drawing, *viz.* that the chief belly of the Obliquus Internus is at the Iliac Spine, that the central fibres only are direct, going across the Abdomen to the Linea Alba; and that the higher fibres ascend towards the Sternum, while the lower ones go obliquely downwards to the Pubis. This is the muscle which gives that muscular covering of the Spermatic Cord, strong in animals, though weak in man, which is named Cremaster. The testicle of the right side is torn up from the Scrotum, and throw out upon the thigh, that the connection of the Spermatic Cord with this the Internal Oblique Muscle, might be seen; and although it could not be distinctly expressed in so small a figure, without exaggerating and departing from the true drawing, yet there is a conical form of the Spermatic


Pl. IX.

matic Cord at its upper end, which shows where the Cremaster Muscle joins it.

3. The TRANSVERSALIS ABDOMINIS, (145.) is seen on the left side. It looks at first sight much like the Internal Oblique, but it is to be remembered, that the Internal Oblique of this side (144.) is thrown down over the thigh. The TRANSVERSE sends all its fibres directly across the Abdomen; and it is seen to belong to the inner surface of the Thorax, as much as the External Oblique Muscle belongs to the outer surface of it. (*a a*) Represent the place where the flesh of this muscle ends and the tendon begins; and the tendon at this point is strongly attached to the tendon of the inner Oblique Muscle. The letters (*a a*) mark the edge where the two thin tendons adhere to form the sheath for the RECTUS MUSCLE; the letter (*b*) is placed in the sheath itself; the sheath is seen again on the left side empty, and marked (*b b*), with the bowels of the Abdomen shining through the back part of the sheath, which though very dense and strong, is yet thin and almost transparent. But at the lower part (*c*), it is less perfect, or rather is wanting; the thinner membrane of the Peritoneum only being found there.

The RECTUS ABDOMINIS, (146.) of the left side remains in its place; it is dissected on its fore-part, so as to show the tendinous intersections (*d d*), where the fore-part of the sheath adheres; but at the back of the sheath (*i. e.*) at (*b*) there are no such adhesions, and though the Rectus is so attached at the fore-part, as to be very difficultly dissected; it lies at its back part so loosely, that it is easily turned out of its sheath with the point of the finger, or the handle of the dissecting knife.

The RECTUS ABDOMINIS of the right side, (146.) is thrown down like a strap over the thigh, so fully that its tendon by which it is fixed into the Bubis is seen, but not very distinctly here, because the tendon is small, when the Pyramidal Muscles are found, as in this subject.

The PYRAMIDAL MUSCLES, (147.) which are as Supplementary Muscles, are seen fully dissected, with neat, small, and fleshy bellies, of a very regular Triangular form; the base of the Triangle being the origin of the muscles from the Pubis; the Apex of the Triangle being its insertion into the LINEA ALBA, and the mark (*) is put upon the place of the Symphisis Pubis.

PLATE

# PLATE X.

*This Plate explains the Text Book, from Page 323, to Page 328.*

THIS drawing explains the Diaphragm in a general way; shewing how it stands, "as a Transverse Partition betwixt the Abdomen and the "Thorax;" and how, by its several openings, it permits the Veins, Arteries, and great Nerves of the Viscera, to pass from the one cavity to the other; but still it is represented here only in a general way; and though its openings are explained, it is rather with the intention of showing their places, and their relation to each other, than with any intention of describing their particular form; which is more accurately delivered in the next plate.

(1.) Is the upper Muscle of the Diaphragm. This upper and greater Muscle rises from the inner surface of the Thorax; and besides this origin from the ribs and Sternum, there is also another origin, *viz.* from the Ligamentum Arcuatum (*), which ligament is of an arched form, crossing the roots of the QUADRATUS LUMBORUM, (125.) and of the PSOAS MAGNUS (157.); so that the greater or upper Muscle of the Diaphragm rises from all the border of the Thorax upon its inner surface, and from this Ligamentum Arcuatum.

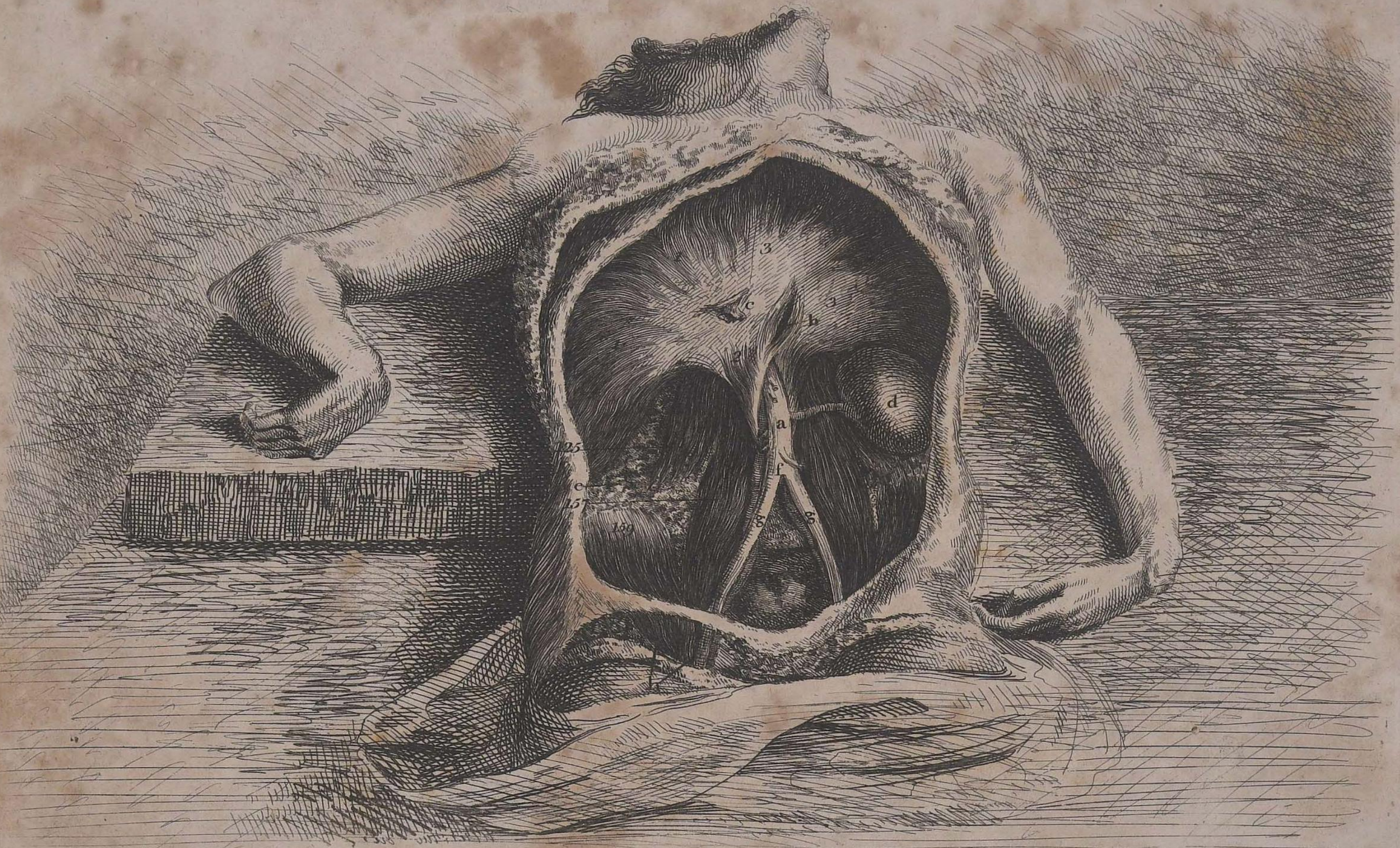
(2.) The LOWER or POSTERIOR Muscle of the Diaphragm rises from the loins by small tendinous heads, which are hidden here by the AORTA (*a*) passing over them; but the fleshy part of this lower Muscle is seen with fibres closely surrounding and embracing the Œsophagus.

(3.) The MIDDLE TENDON is seen, but I do not enter upon the detail, nor pretend to represent the crossing of the Tendinous Fibres in this general drawing.

Thus is the Diaphragm, composed of one great and circular muscle before, of one smaller circular muscle behind, and of the triangular tendon betwixt them; and, both in its fleshy and tendinous parts, it is perforated by several vessels, passing reciprocally between the Thorax and the Abdomen.

First, (*a*) the AORTA, the great artery of the trunk, passes betwixt the Crura, or legs of the Diaphragm, which like an arch strides over it to defend it from pressure.

Secondly,

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Beugo sculp.

Secondly, The Œsophagus (*b*), which passes through the Diaphragm, a little above the Aorta, and a little towards the left side. Its passage is by the hole (*b*) through the lower fleshy belly, and through the most fleshy part of the Diaphragm, and the muscular fibres of the Crura Diaphragmatis first cross under the hole for the Œsophagus. They surround it, then cross again above the hole, so that they form the figure of 8; and the Œsophagus is so apparently compassed by these surrounding fibres, that some anatomists have reckoned this a sort of Sphincter for the upper orifice of the Stomach.

Thirdly, The Great Vena Cava; (*c*) (both that branch of the Great Vena Cava, which belongs to the Liver, and that also which comes from the lower extremity) goes up to the right side of the Heart, through the right side of the Diaphragm by the hole (*c*), where a part of this great vein is seen hanging down with a flaccid and open mouth; and this hole (*c*), being of a triangular form, passing in the hard tendon, and being larger than the vein requires, there is no danger of the vein being strangulated.

(*d*) Is the Left Kidney.

(*e*) Is the Cellular Substance in the loins, in which the right kidney lies, the kidney of that side being torn away.

(*f*) Is the Bifurcation of the Aorta a little above the top of the Sacrum, and (*g*) the two Iliac arteries.

(159.) Is the Iliacus Internus Muscle, and (*h*) shews the manner in which the Iliacus Internus, Psoas Magnus, and Femoral Artery, come out from under the Femoral Ligament.

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The anatomy of the Diaphragm is continued in the next plate.

PLATE

# PLATE XI.

*This Plate explains the Text Book, from Page 325, to Page 335.*

THIS plate consists of plans of the Diaphragm, and Parts of Generation.
The first Figure is a drawing of the Diaphragm, neatly dissected and taken out of the body; explaining all its origins, and all its holes more correctly than plate x.
The second Figure is rather a plan than a drawing, and may be very useful to the young anatomist, in giving him correct notions of the general form of the Diaphragm, how it stands slaunting upon the whole; convex towards the chest, concave towards the belly, and moving (as it may easily be conceived by this drawing,) so as to perform respiration, and all the lesser functions that depend upon it.
And the third Figure explains the Muscles which belong to the parts of Generation. This is by no means a plan merely, as might be conceived from the formal shapes of these Muscles, but a true drawing after several careful dissections, where, though the parts seem formal, they are really natural, not exaggerated nor caricatured, but delivered fairly and honestly, as they must always be seen after a right dissection. And they are exposed in such a posture, as by its correspondence with that for Lithotomy, will at once convey a lesson of surgery, while it gives correct and true ideas of these parts.

## FIGURE I.

### DRAWING OF THE DIAPHRAGM.

The parts pointed out along with the Diaphragm marked (145.) are parts of the Transverse Muscles of the Abdomen, which, being internal muscles and rising from the inner surface of the Thorax, have their tongue-like origins (*a a a*), which

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which come from the ribs, mixed confusedly with (*b b b*), the tongue-like origins of the great muscle of the Diaphragm, which tongue-like origins (*b b*) come from the same ribs; and it was from this connection with the two Transverse Muscles of the Abdomen, that the Diaphragm was once reckoned a Trigastric Muscle: *Vide* Book of the Muscles, page 315.

(1.) The greater, or upper muscle of the Diaphragm, has these five origins; on both sides (*d d d d*) mark the flesh which rises from the ribs, from the inner surface of the Thorax, indigitated with the origins of the Transverse Muscle; (*e e*) mark the two backmost portions of the great Anterior Muscle, and these two portions rise from the two Ligamenta Arcuata, which stretch over the origins of the QUADRATUS LUMBORUM and PSOAS Muscles. And (*f*) marks a fifth portion of the greater muscle, which rises from the inner surface of the Sternum and Xiphoid Cartilage.

(2.) The lesser muscle rises by four tendinous feet from the fore-part of the Lumbar Vertebræ; and these, the CRURA DIAPHRAGMATIS (*g g*), which surround the trunk of the Aorta, and their tendinous feet (*h h h*) are very fairly represented here, for they are not nicely cut and pared into distinct feet, but are represented as they are taken up from the face of the Lumbar Vertebræ; that is, not in the shape of four distinct tendons, but adhering to each other in the form of a sort of dense tendinous membrane, very white and glistening; forming a sort of sheath over the fore-parts of the Vertebræ; having flat strings, which are thicker and stronger, and more brilliant than the others; but not to be separated (without violence), into the shapes of distinct feet.

The tendinous feet of the Diaphragm (*h h*), unite into the Crura at (*g g*), and the two Crura, growing gradually more fleshy, form at (*i i*) the Posterior Muscle of the Diaphragm; and it is here, that the fibres of this Posterior or lesser Muscle cross and mix, and surround the hole for the Œsophagus, with those fibres, which by their crossing, describe irregularly the figure of eight; and by their compressing the Œsophagus, form a sort of Sphincter.

(3.) The CENTRAL TENDON is composed of fibres, "which come from the various Fasciculi of this muscle, and meet and cross each other with a confused inter-lacement which Albinus has been at much pains to trace, but which Haller describes much more sensibly, as Intricationes variæ, et vix dicendæ; irregular and confused crossing chiefly at the openings, and especially at the Vena Cava, the triangular form of which seems to be guarded in a most particular way." *Vide* book, page 327. And the Figure (3, 3.) is repeated upon the surface of the tendon, to shew the various Fasciculæ of the tendinous fibres, which are truly "variæ et vix dicendæ," and which it were not only difficult, but useless to describe.

(*k*) Is the Aorta, where it comes out from the Thorax into the Abdomen; it is here

here flaccid, and uninjected. Its first branches, *viz.* the Cæliac, and upper Mesenteric Arteries are seen going off at this point. It was drawn aside to shew the hole through which it passes, and was fixed so by a pin.

(*l*) Is the hole, by which the Œsophagus passes, left empty.

(*m*) Is the hole, by which the Vena Cava passes through the tendinous centre of the Diaphragm.

## FIGURE II.

In this FIGURE, the Diaphragm is drawn in a new posture; for the trunk (*viz.* the Pelvis and Thorax, with the intermediate Vertebræ of the loins) is set almost upright. And first, the Convexity of the Diaphragm, towards the Thorax (*a*), should be observed. Secondly, the obliquity of the Diaphragm should be observed; its greater muscle rising from all the borders of the Thorax, as at (*b b*), while its Crura and tendinous feet rise near the top of the Pelvis, from the lowest Vertebra of the loins. Thirdly, the true appearance of the tendinous feet is marked, the longest lying in the middle, and the shorter ones being more to the side; so that (*c*), the longest one, lies fair upon the fore-part of the Vertebra of the loins, and rises almost from the lowest Vertebra; while the shortest one (*d*) rises from the Transverse Process or the fourth Vertebra of the loins.

## FIGURE III.

The third Figure of this plate explains the Muscles of the parts of generation, the hips and thighs being presented as in the operation of Lithotomy.

For the full explanation of these Muscles, the student must turn to the Book of the Muscles, chapter vii. page 329. where he will find that,

(1.) The ERECTOR PENIS (150.) is a delicate and slender Muscle about two inches in length, rising from the Tuberosity of the Os Ischium (*a*); lying along the root of the CRUS PENIS, where it is smallest; inserted into the Crus Penis; being very small, and almost pointed both at its origin, and at its insertion.*

* Haller will not allow this Muscle the name of Erector; he says it does not draw the Penis back to the Pubis, but that its office rather is to depress the Penis, and hold it down to the proper angle, for entering the Vagina. What a pity it is that the illustrious author had not ascertained this curious angle! for we should naturally conceive, at least from what we see after our injections, that the Penis when in full erection, stood up to the Pubis as close as it could lie.

(2.)

(2.) The TRANSVERSALIS PERINÆI, (151.) rises along with the Erector; from the Tuber Ischii (*a*), it crosses the deep hollow which is betwixt the Ischium and the Anus; and is fixed into the backmost point of the bulb of the Urethra.

(3.) The ACCELERATOR URINÆ, (152.) is a double Muscle; or a pair of Muscles, one lying upon each side of the bulb of the Urethra, so that the whole fairly surrounds the bulb. And indeed this tumour of the bulb seems chiefly formed to favour the action of the Accelerator Muscle; and the two slender and horn-like tendons of the Accelerator are seen plainly turning off from the cavernous body of the Urethra (*b*) to go out upon the cavernous body of the Crus Penis (*c*), by which hold it plays more powerfully upon the bulb. We feel the actions of this muscle very plainly in the throwing out of the last drops of urine, as well as in the ejaculation of the Semen; and its great power of throwing the Semen to a distance has been ascertained by experiments, such as should not be repeated nor mentioned, indeed, except in that language in which they were told. "Constat enim per experimenta, ob turpitudinem non repetenda, "multo longius semen de sano et dudum casto homine proselire quam abest "uterus." The SPHINCTER ANI (153.), is seen surrounding the opening of the Anus.

Wounds of these muscles are attended with no degree of danger, nor followed by any kind of incapacity, but yet it is very manifest, that since the incisions for Lithotomy should be made in one regular and uniform line, these muscles will be cut by every dextrous operator in one certain way; and the naming them wrong must be a mark either of ignorance of these parts, or at the least, of a bad irregular operation. Now, as the aim of the Lithotomist is to get into the bladder by that great hollow which lies betwixt the Tuberosity of the Os Ischium (*a*), and the Anus (*d*); the incision must pass exactly in the middle betwixt the Tuber and the Anus. The Transversalis Perinæi must be fairly cut across; the Accelerator will be spared; the Erector cannot be cut; and the operator who cuts the Accelerator, keeps his knife too near the Anus, and wounds the bulb. The operator who speaks of cutting the Erector, either must be very ignorant of this same Erector, or must intend to cut upon the Tuberosity of the Ischium, hoping perhaps to cut through the bone: But what shall we think of a surgeon, who speaks about things of this kind so loosely, as to talk of cutting both the Erector and the Accelerator Muscle; that is of cutting both that muscle which lies on the outside of the common incision, and also that one which lies on the inside of the common incision: After reading this in any author, one might be inclined to turn backwards a page or two, to see whether he made an incision like that of Celsus; *viz.* in the shape of a half-moon.

# PLATE XII.

*This Plate and the next explain the Text Book, from Page 336 to Page 384.*

## OF THE LOWER EXTREMITY.

IN this plate are explained the chief muscles of the Thigh, Leg, and Foot. The limb is hung by a rope, the foot swinging in the air, the ball of the great toe touching the ground. The leg is presented twice. In a fore view shewing the great fascia of the thigh dissected back, and the muscles naked, Fig. i. And again, in a back view, Fig. ii. shewing the cavity of the Pelvis; the hollow betwixt the Ham-string muscles, and the bellies of the Gastrocnæmii with the great Achilles Tendon. The explanations cannot be orderly, and therefore they should be short.

In FIGURE I. (*a*) marks the Spine of the Ilium; (*b*) the crest of the Pubis; (*c*) the ligament of Paupart which runs betwixt these two points; (*d*) the Femoral artery passing under the ligament. The muscles which appear on the fore-part of the thigh are these.

The RECTUS (171.) lying in the middle of the thigh, having a white and tendinous part in the centre, and the fleshy fibres going in towards it.

The VASTUS EXTERNUS (173.) making all the flesh on the outside of the thigh.

The VASTUS INTERNUS (174.) making that cushion of flesh, which is so prominent upon the inner side of the knee joint, and which makes so particular a mark in the drawings of the thigh: and all these three muscles, viz. the Rectus, Vastus Externus, and Vastus Internus, are inserted together into the Patella, which is marked (*e*).

Then the SARTORIUS (175.) is seen rising from the highest point of the Os Ilium; crossing the thigh, long and slender like a strap, and bending down the Vastus Internus Muscle.

The head of the Gracilis (176.) where it rises from the Pubis is here seen; next to that is seen the first head of the TRICEPS (161.); and next to that the PECTINALIS (160.) with the artery of the thigh lying flat upon its belly.

These

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These are the chief muscles on the fore part of the thigh; they are naturally covered with the FASCIA, or broad tendinous expansion, marked (*f*), and the FASCIALIS MUSCLE, which, from its making this vagina tense, is named Tensor Vaginæ Femoris; is marked with its appropriated number (156.) and is drawn out along with the Fascia, and is seen rising from the same point of the Os Ilium, from which the Sartorius rises.

In the LEG, (*g*) marks the Tibia; and the muscles are,

The GASTROCNÆMIUS, (181.)

The TIBIALIS ANTICUS (187.), which comes from the fore part of the Tibia, crosses the ancle obliquely, goes over the side of the foot to be implanted into the root of the great toe; and this is the tendon which makes that sharp angle on the fore-part of the ancle where the buckle lies.

The EXTENSOR POLLICIS (196.) lies next to the Tibialis, and its tendon passes like that of the Tibialis Anticus under the Annular Ligament of the ancle, which is marked (*h*); and next to the Extensor Pollicis lies the EXTENSOR LONGUS DIGITORUM PEDIS (193.) which lies deeper still, and more towards the outside of the leg. Its tendons are seen going out to each of the toes, and these tendons are accompanied with the tendons of the little muscle the EXTENSOR BREVIS DIGITORUM PEDIS (195.), which is seen lying under the tendons of the long muscle.

Behind the Extensor Digitorum, and hiding it in part, is the PERONEUS LONGUS Muscle (184.), which belongs to the brawn of the Leg, and the tendon of which passes down behind the outer ancle.

In the foot, Fig. II. lying under this one, is explained the Plantar Aponeurosis or that Fascia which belongs to the sole of the foot; and which is described in the Book of Muscles, page 382. It is seen here to consist of three general divisions, the middle one (*i*), the lateral one (*k*) on the outside, which covers the Flexor, and the Abductor Minimi Digiti; and the lateral one (*l*) on the inside, which covers the Flexor and the Abductor Pollicis.

The general Fascia where it covers the thigh is marked (*f*) but it is merely a continuation of the same Fascia that covers the leg; and where it covers the leg it is marked (*); and it is still the same Fascia which being continued over the fore-part of the foot, is there strengthened by its adhesion to the outer and inner ancles, by which, taking a new form it becomes the Annular Ligament, so that the Annular Ligament is merely a strengthening of the common Fascia.

## FIGURE III.

THIS view shows chiefly the muscles upon the back part of the thigh and leg.

The Vertical Section of the Os Sacrum is marked (*m*); the hollow of the Pel-

vis

vis is marked (*n*); the Vertical Section of the Os Pubis is marked (*o*); and the letter (*p*) is put down upon the Tuberosity of the Os Ischium, which could not be clearly marked. And the muscles are,

The PSOAS MAGNUS (157.) crossing the brim of the Pelvis, to go down into the thigh.

The GRACILIS (176.), which is seen coming from the arch of the Pubis, and going down to be inserted by a delicate and slender tendon, into the head of the Tibia.

The first and second heads of the TRICEPS, (161.) are seen from behind.

The SEMI-MEMBRANOSUS (178.) is next seen, but the whole of it is not seen; nothing is bare here but the middle and lower parts of the muscle; but there is enough of it to show that it is not as its name imports, a muscle having a membranous appearance, it has on the contrary a very thick fleshy belly.

The SEMI-TENDINOSUS (177.) is next to it, and the reason of its being named Semi-tendinosus is seen in the length of its tendon (*q*). The Semi-membranosus and the Semi-tendinosus form together the inner ham-string. The outer ham-string is formed by the Tendon of the Biceps Cruris Muscle; and the belly of the Biceps (180.) is seen held out by three sticks, so as to show the deep hollow betwixt the ham-strings, in which is seen hanging the great SACRO-SCIATIC NERVE (*r*); where it is going down the back of the thigh, to pass down under the heads of the Gastrocnemii Muscles.

The GREAT GLUTÆUS MUSCLE (163.) is seen upon the hip dissected, so as to show the order of its fibres, and hanging like the rest of the leg all loose and flaccid.

The VASTUS INTERNUS (174.) is also seen making a fleshy belly just over the knee-joint.

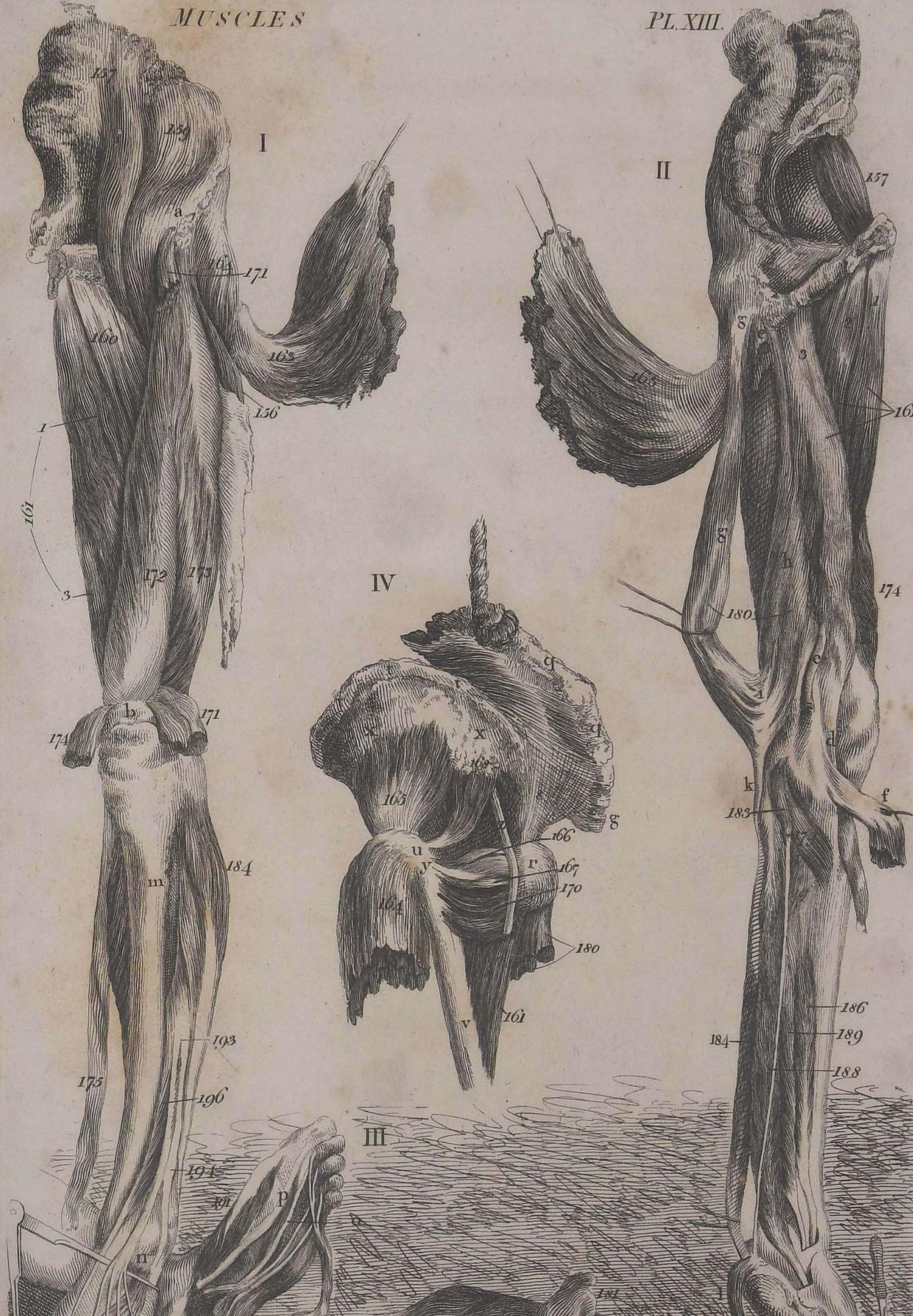
The two bellies of the GASTROCNEMIUS MUSCLE (181.) are seen rising each from its own Condyle of the thigh-bone at (*s s*), and meeting together to be joined into the great Achillis tendon (*t*); which grows gradually smaller as it goes downwards to be implanted into the heel at (*u*), where still it is very thick and strong.

The great belly and tendon of the FLEXOR POLLICIS (188.) is also seen passing behind the inner ancle.

A part of the belly of the SOLÆUS (182.) is seen lying under the belly of the Gastrocnemius.

The foot in this drawing, is left covered with skin, and puffed, and ill-shaped, as it naturally is, while under dissection.

PLATE



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# PLATE XIII.

*This Plate explains the Text Book, from Page 336, to Page 384.*

SHOWS the deeper muscles of the THIGH, LEG, and FOOT, also in two drawings; one representing the fore, and the other the back parts of the leg. This is a fuller dissection than the last, so that it differs greatly in general appearance from the last drawing, but still the general position is exactly the same.

In FIGURE I. are seen,

The GLUTÆUS MAXIMUS (163.) now dissected, and cut away from its origin in the haunch bone, left at its insertion into the thigh bone. It is hung out by a string, and the shape which it falls into shews that it is one of the heaviest and fleshiest muscles in the body; a part of the Glutæus Medius (164.) is seen under it.

The RECTUS FEMORIS (171.) is now cut away, and nothing of it is left here, but its origin from the Spinous Process marked (*a*); and its insertion into the Patella, which is marked (*b*) is thrown down and left hanging. By the throwing down of the RECTUS FEMORIS, the great mass of the CRURÆUS (172.) which lies under it is exposed, and it is seen that the Cruræus consists partly of tendon, partly of flesh, extends all along the thigh, rises from the thigh bone, lies immediately under the Rectus, and is inserted along with it into the Patella; and here the VASTUS EXTERNUS (173.) is seen in its place. The VASTUS INTERNUS (174.) is cut and thrown down, and left hanging over the knee like the Rectus.

The SARTORIUS (175.) is also cut away from the Ilium, and left hanging down along the leg.

The FASCIALIS (156.) is seen here also, with a rag of its Fascia connected with it.

The PSOAS MAGNUS (157.) which comes from the sides of the Lumbar Vertebræ, and the ILIACUS INTERNUS (159.) which comes from the inside of the haunch bone, are seen turning over the fore-part of the Pelvis together to go down through among the flesh of the thigh, to the lesser or inner Trochanter of the thigh bone.

The

The PECTINALIS (160.) is seen rising from the Pubis, and stretching flat and direct towards the thigh bone.

The TRICEPS LONGUS marked (1.), as it is the first head of the Triceps Femoris, (161.) is seen here thick and fleshy. This covers the other two heads of the Triceps, *viz.* the Triceps Brevis, and Triceps Magnus; the edge of the TRICEPS MAGNUS, or third head of the Triceps, is seen here, (3.) ; but the TRICEPS BREVIS or second head of the Triceps is here entirely covered by the Pectinalis and Triceps Longus, and is seen only in the second drawing, where it is marked (2.)

The muscles on the back parts of the hip and thigh, are explained in figures ii. and iii.

In FIGURE II. we have the GLUTÆUS MAXIMUS (163.) hung out by a string as in the other drawing. The PSOAS MAGNUS (157.) crossing the brim of the Pelvis as in the former drawings; the Triceps Longus marked (1.) descending from the Pubis, to the middle of the thigh bone ; behind that is seen the Triceps Brevis, vel secundus, (2.) the second head of the Triceps, which is held as a part of the same muscle, though it lies behind the first, and is of a different layer; and behind that still lies the Triceps Magnus (3.), which has also very little connection with the other heads, but it is called the third head of the Triceps ; and there is seen the Femoral Artery marked (*c*) passing through the Triceps Magnus from the fore to the back part of the thigh ; the artery is marked (*c*), and the tendon of the Triceps Magnus, where it is implanted into the inner Condyle of the thigh bone, is marked (*d*) ; so that the artery passes through the Triceps from the fore to the back part of the thigh, only a little above the knee.

The root of the Semi-membranosus (178.) is seen at (*e*), where it rises by a thick and fleshy head from the Tuberosity of the Os Ischium ; the lower end of it where it is attached to the head of the Tibia is cut, and hangs down at (*f*).

The opposite Ham-string Muscle the Biceps (180.) is seen ; its bellies are marked with the proper number of the muscle. Its longer head is seen rising in common with the Semi-membranosus from the Tuberosity of the Os Ischium at (*g*); the longer head is marked (*g*), but the shorter head of the Biceps which rises from the back of the thigh bone, is marked (*h*) ; the place where the long and the short heads of the Biceps Femoris unite and mix their fibres is marked (*i*) ; and the tendon of the Biceps which forms the outer ham-string is marked (*k*).

All the ham, or the back part of the knee-joint, is now exposed by the throwing down of the conjoined muscles, the GASTROCNEMIUS EXTERNUS (181.) and the SOLÆUS, (182.) which are left only at their insertion by the great Achillis Tendon (*l*), which is fixed into the heel bone ; and the Gastrocnemius and Solæus being thus thrown down, the two curious muscles which lie in the ham are exposed, *viz.* the PLANTARIS (183.) which rises from the outer Condyle

Condyle of the Os Femoris, has a very small delicate fleshy belly, like that of the PALMARIS LONGUS. It has also a small round tendon like it, the smallest and longest in the body, not grosser than a fiddle-string, which going down along the inner surface of the Gastrocnemius, and making an impression upon the inner surface of the Great Achillis Tendon, accompanies it to the heel, where it is implanted along with it.

The other small muscle is the proper muscle of the ham, which is thence named MUSCULUS POPLITÆUS (179.) It is a beautiful triangular muscle, which lies exactly upon the back part of the joint as a sort of guard to the Capsule, and like a check band for supporting the knee. It comes from the outer Condyle along with the little belly of the Plantaris, crosses the joint with oblique fibres; comes from the Condyle of the thigh bone; is inserted into the back of the Tibia, and so bends the knee.

In the legs of both drawings, the following deep seated Muscles are seen. In the first leg, the deep muscles of the toes which lie under the Tibialis Anticus, and they are all extensors of the toes. In the second leg the deep muscles which lie under the Gastrocnemius and Solæus; and they are all flexors of the toes.

In FIGURE I. is seen (*m*), the place upon the fore-part of the Tibia, from which the fleshy belly of the TIBIALIS ANTICUS is cut away, so that the next muscle the EXTENSOR POLLICIS (196.) is seen, which is a long, penniform, and very strong muscle; and its long tendon is seen going to the great toe.

Behind that again, lies the EXTENSOR LONGUS DIGITORUM PEDIS (193.), which has its fleshy belly lying behind the Extensor Pollicis; and its four tendons are raised over one leg of the compasses, so as to expose the short flexor which lies beneath, upon that part of the foot where the buckle rests; and which is seen beginning by a small head (*n*), from the heel bone. Behind the Extensor Digitorum lies a third muscle, which is like a slip of the Extensor, but its tendon does not run into the toes. It is fixed into the side of the foot at the root of the little toe, it is therefore a bender of the foot, and from its rising from the FIBULA, is named PERONEUS TERTIUS (194.)

And Lastly, in this figure, a part of the PERONEUS LONGUS (184.) is seen, a muscle which rightly belongs to the other side of the leg, and the tendon of which passes behind the outer ancle, to go down into the sole of the foot.

In FIGURE II. are seen, in like manner, all the long flexors of the toes and foot.

First the TIBIALIS POSTICUS (186.) begins with a strong fleshy belly upon the back part of the Tibia; is penniform like most of these long muscles of the leg; and sends a long tendon down behind the inner ancle, which runs in a particular ring of the Ligaments that are behind the ancle; and, getting into the sole of the foot, is fixed by many spreading roots into the several bones of the Tarsus.

 The

The FLEXOR LONGUS DIGITORUM PEDIS (189.) lies immediately behind this; is like it in all points; sends its long slender tendon down also behind the ancle in its own peculiar ring, but, passing the bones of the Tarsus, it divides into four tendons, which go to each of the lesser toes.

The FLEXOR LONGUS POLLICIS PEDIS (188.) is the appropriated muscle of the great toe. It has a large fleshy belly, a very strong big tendon, and runs by the inner ancle in its own peculiar ring. Now it is to be noticed that this Flexor Pollicis, though the flexor only of one single toe, is much bigger than the common flexor of all the toes. It is even bigger than both these, or the Tibialis Posticus, which is the great muscle of the foot. The meaning of which is very plain, *viz.* that these muscles of the toes are to be considered not so much as mere benders of the toes; for when we observe how little the toes move, and how much walking consists in rising upon the ball of the great toe, we shall regard these muscles rather as benders of the whole foot. It is by the power of these muscles, that we beat the ground in each step in walking, for in walking each push in carrying the body is made by the pressing of the ball of the great toe against the ground; and these muscles all press down the ball of the great toe. In making the step, these flexor muscles of the toe, and foot, are chiefly assisted by a muscle belonging to the other side of the leg, I mean the PERONEUS LONGUS (184.), which rises not like these, from the back of the Tibia, to pass behind the inner ancle, but from the whole length of the Fibula, whence its name of Peroneus, and passes down in a ring behind the outer ancle; and this strong tendon which makes the sharpness behind the outer ancle, and gives shape to the leg, is here drawn out with a string just where it is descending into its sheath or ring.

Thus all the muscles which bend the foot, and so raise the body at each step, are distinctly seen in this dissection, *viz.* The GASTROCNEMIUS (181.) the SOLÆUS (182.) and the PLANTARIS (183.); the TIBIALIS POSTICUS (188.) FLEXOR DIGITORUM (189.) FLEXOR POLLICIS (188.) and PERONEUS LONGUS. (184.) There is but one more, the Peroneus Brevis, which is so exactly like the Peroneus Longus, that its not being seen in this view, is hardly an imperfection, the demonstration being sufficiently full.

The foot is dissected in Figure iii. where is seen first the short flexor, the FLEXOR BREVIS DIGITORUM PEDIS (191.), cut up from the heel bone where it has its origin; its fleshy belly is thrown out; its short neat tendons are going to each of the toes; its tendons are perforated like those of the hand, for the transmission of the tendons of the long Flexor. The tendons of the long Flexor are marked (*o*); they are seen going forwards to thread the loops, made by the short tendons; and there is seen connected with the long Flexor that short supplementary muscle which comes from the heel bone, and which being irregular

in

in its form, is called the MASSA CARNEA JACOBI SILVII (190.) The Lumbricales are too delicate to be seen in a small drawing like this, but they are easily found in dissection, for they are like a continuation of the Massa Carnea lying in the forks of the tendons.

The tendon of the long Flexor of the great toe is seen here (*p*), escaping from under the inner ancle, and appearing upon the sole of the foot; and it is seen to be connected here (by a small slip of tendon) with the long Flexor of all the toes. This tendon of the long Flexor of the great toe is seen to pass betwixt the two heads of the short Flexor, which is marked with its proper number (191.) the Abductor of the little toe is also seen.

There remain to be explained, certain muscles which immediately surround the hip joint; and which are described in the book from page 347 to 352.

The TROCHANTERS are so named, because they are placed so that most of the muscles which are implanted into them, at the same time that they bend the thigh, turn it also.

These muscles are explained by figure iv. The Pelvis is hung up by a rope, put round the Lumbar Vertebræ; and the points of bone to be observed as explaining the posture are (*q*) the line of the Os Sacrum, and Os Coccygis; (*r*) the tuberosity of the Os Ischium; (*s*) the Sacro-Sciatic Ligament, passing from the Sacrum to the Ischium; (*t*) the Spine of the Ilium; (*u*) the great Trochanter of the Thigh Bone; and (*v*) the shaft of the same bone.

And the muscles that are seen are,

FIRST, the GLUTÆUS MEDIUS (164.) cut away from its origin, which is from the Os Ilium at (*x*); the great Glutæus which rises from the Sacrum and Ilium, from (*g*) to (*t*) being cut entirely away. The middle Glutæus (164.) is seen to be implanted into the very Apex of the Trochanter; the GLUTÆUS MINIMUS (165.) which lies under it, rises again from that part of the Os Ilium that forms the Socket for the Thigh Bone; and is of course the deepest and the smallest of these muscles.

Behind the GLUTÆUS MINIMUS is seen the PYRIFORMIS (168.); and the reason of its name, taken from its Pyramidal form, is well explained; and its broad thin belly is seen coming from the hollow of the Sacrum within the Cavity of the Pelvis; and its small flat tendon is seen inserted into the root of the Trochanter Major.

The QUADRATUS FEMORIS, (170.) a short and square muscle is seen coming from the tuberosity of the Os Ischium, and implanted into the greater Trochanter.

The muscles, named Marsupiales, are seen going into the Trochanter at the point marked (*y*); and I do not put their right numbers (166.) (167.) upon them, lest it should confound so small a drawing. Besides, it will be easily enough understood, that the white tendon, marked (*y*), is the tendon of the Obturator In-

ternus, which comes from within the Pelvis, turning over the tuberosity of the Os Ischium; and the little fleshy slips above and below this white tendon, and inclosing it upon either side, are the GEMINI MUSCLES (166.) (167.), one above another below the Obturator Internus, and all the three inserted together into the root of the Trochanter at the point (*y*). A part of the TRICEPS FEMORIS is marked (161.); the heads of the Biceps, and of the Semi-tendinosus, and Semi-membranosus where they all three rise together from the tuberosity of the Os Ischium, have the mark of the Biceps only, which is (180.)

The SACRO-SCIATIC NERVE, where it comes out from the cavity of the Pelvis, along with the Pyriform Muscle, is marked (*z*).

THE

# THIRD BOOK.

OF THE

# JOINTS.

# BOOK THIRD.

## OF THE

# JOINTS.

IF this book seem short, it is because I have omitted many joints, which it is decent and proper for the professed anatomist to be acquainted with, but which it were very superfluous to trouble the student about, for the subject is hardly even curious, and certainly not useful. Therefore I have made a fuller description of the shoulder, knee, and hip; and have refrained from giving any drawings of the joints of the head, of the Vertebræ, or of the ribs; for these joints are not easily understood, are hardly worth remembering, and are very soon forgotten. It was natural for me to be afraid lest the history and drawings of these joints might swell the book, making it more expensive, and less useful.

PLATE

# PLATE I.

*This Plate explains the Text Book, from page 427, to page 439.*

EXPLAINS the Shoulder Joint, Elbow, and Wrist.

## FIGURE I.

IS the shoulder joint which was set up for this drawing, the whole piece of anatomy resting upon the lower angle of the Scapula, and upon the cut end of the Os Humeri. The marked points by which the muscles and the joint are explained, are these chiefly: (*a*) The Clavicle; the letter (*a*) is placed on the middle of the bone, where it projects in the collar or root of the neck; (*b*) is the end next the Sternum with some ragged flesh hanging from it; (*c*) is the flat end by which it touches the point of the Acromion Process; (*d*) marks the Acromion Process where the Clavicle is joined to it; and (*e*) is the point or apex of the Coracoid Process. (*f*) Marks that line of the Scapula which is called its base, and it, like the Clavicle, has the remains of its ragged muscle hanging down from it. And lastly, (*g*) is the Os Humeri.

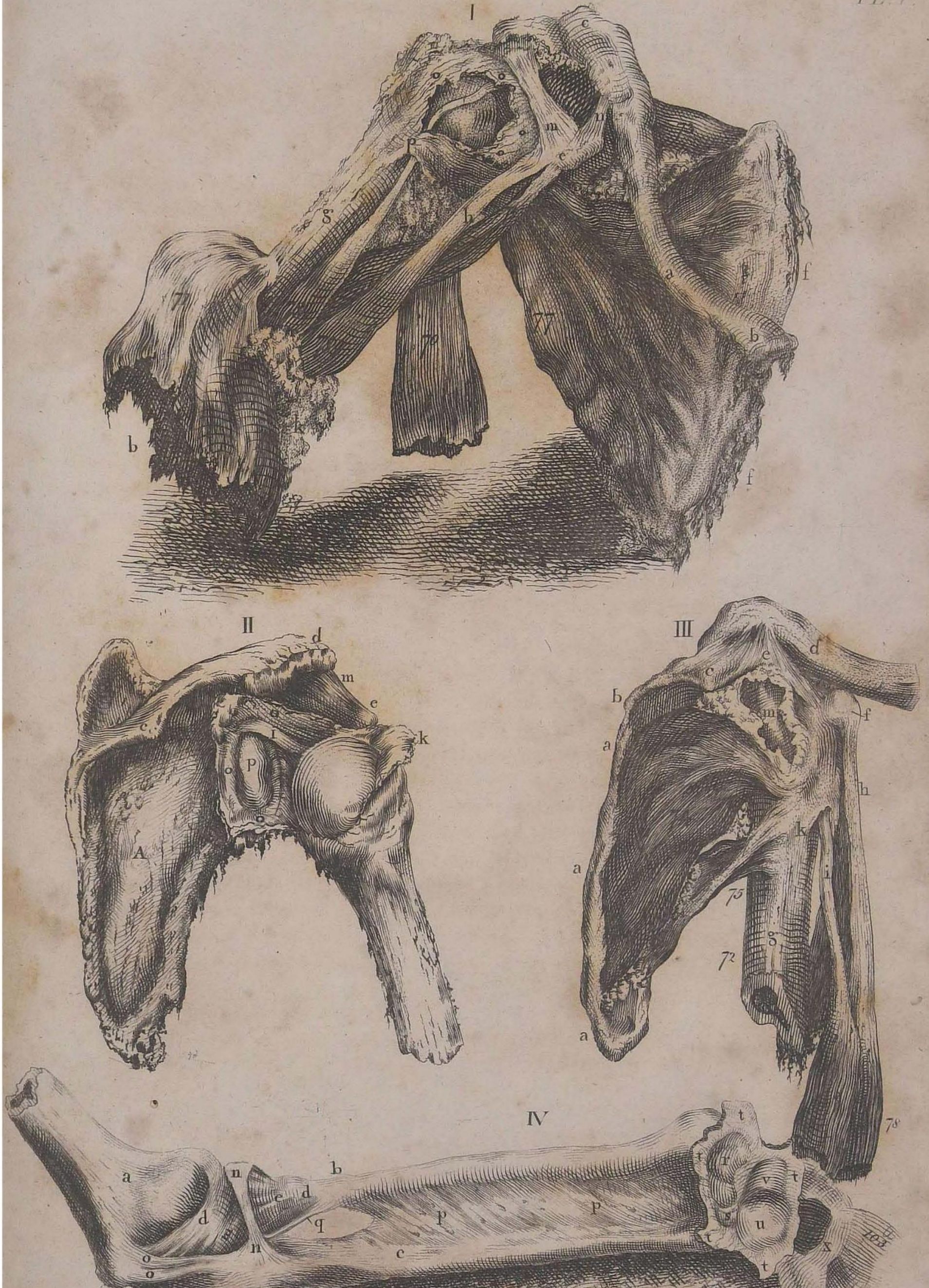
The muscles which are seen here are,

The SUBSCAPULARIS (77) covering the whole of the lower surface of the Scapula, and better explained than in the smaller drawings for the muscles of the arm. A small part of the SUPRA-SPINATUS (73.) is also seen.

The Biceps (78.) is marked in the bellies with its proper number, and its two heads are also marked; the shorter head (*h*) rising from the Coracoid Process; and the longer head (*i*), coming down from within the cavity of the joint.

The Coraco-Brachialis (72.), is seen hanging down loose and flaccid, from the Coracoid Process, and passing obliquely under the two heads of the Biceps; to be fixed into the arm-bone.

The DELTOIDES (71.) is cut away from the Scapula and turned backwards, and it hangs over the arm bone very thick and massy. And this white and shining appearance upon the inner surface of the Deltoides is from the Cellular Substance which

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which lies under it being condensed into somewhat of the form of a fascia. And it is from this fascia, that one of the great Bursæ Mucosæ belonging to this joint rises. The flesh of the Deltoides is seen at (*b*), and the fascia, covering the face of the muscle, is marked with the number (71.) And lastly, the LATISSIMUS DORSI (70.) is seen cut off about six inches from its insertion into the shoulder bone, and left hanging there. (*k k*) Wherever they are found, denote the fat which lies in the interstices of the muscles, and which should not be too curiously picked away in any part of a dissection, unless it be necessary for making some important part very clean and distinct.

The parts more immediately belonging to the joint are these.

1. The Acromion Process (*d*) overhangs the joint from above, and prevents luxations upwards.
2. The Coracoid Process (*e*) stands up on the inside of the arm, to strengthen the joint in that direction also.
3. The LIGAMENTUM PROPRIUM TRIANGULARE SCAPULÆ (*m*) crosses from the Acromion to the Coracoid Process, makes a sort of bridge betwixt them, and keeps all firm in that direction.
4. Another ligament is seen here, the LIGAMENTUM COMMUNE TRAPEZOIDES (*n*), which does not rightly belong to this joint, being but a ligament of the Clavicle; so that there are the following parts attached to the Coracoid Process (*e*), *viz.* the Coraco-brachialis (72.), and the short head of the biceps (*h*), going down from it, the Ligamentum Triangulare Proprium (*m*) going to the Acromion, and the Ligamentum Commune (*n*) going to the Clavicle.

The Capsule or bag of the joint which is exceedingly thin, and lax, is marked (*o o*); and it is cut open to shew the head of the bone, as it lies in its socket. This shows also the long tendon (*i*), of the Coraco-brachialis as it comes through the socket, lying upon the round head of the shoulder bone. And, lastly, the flat tendon of the Subscapularis is seen spreading over the Capsular Ligament at (*p*), by which it will be easily conceived, how the other muscles spread over the Capsule to strengthen it; for here it is seen, that the cut edge of the Capsule, and the cut edge of the tendon of the Subscapularis is one and the same part; that is, the flat tendon and the Capsule are so incorporated, that the one cannot be cut nor torn without the other. And thus it may be understood, how the chief security and strength of the shoulder joint is from the muscles surrounding its Capsule so closely, and being implanted directly into the head of the bone.

## FIGURE II.

Is intended chiefly for showing the shallowness of the Glenoid Cavity, when compared with the head of the bone, and it also explains very well the way in which the long tendon of the biceps rises from the margin of the Glenoid Cavity.

The Scapula (A) is naked, but with the remains of ragged flesh hanging about it; where (*c*) marks the Spine of the Scapula rising towards (*d*), which is the point of the Acromion Process; (*e*) marks the apex of the Coracoid Process scarcely seen; (*m*) is the Ligamentum Proprium Triangulare lying rather in shadow; the Capsule is here also marked (*o o*); it is cut up and thrown quite back in a square form from the manner in which it is cut; the edges of the cut Capsule are still seen surrounding the shoulder bone, as well as the Glenoid Cavity; and this throwing back of the Capsule shows the shallowness of the Glenoid Cavity (*p*), and the roundness and largeness of the head of the shoulder bone; and within the Capsule is seen the long head (*i*) of the biceps, rising from the margin of the socket, at its upper part. (*k* Marks the remains of the tendon of the Supra-spinatus Muscle, where it lies upon the Capsule and adheres to it; and it is this tendon which gives the Capsule an appearance of thickness, and makes it turn so rigidly backwards at this particular point (*k*).

## FIGURE III.

May be compared with figure i. to observe how entirely the joint is surrounded with its great muscles: For here is the Infra-spinatus covering the Capsule, just as the Subscapularis does in figure i. But the chief use of this figure is to give a true notion of one of the greatest Bursæ Mucosæ that belong to the shoulder joint.

The Parts marked in this drawing are,

The basis of the Scapula (*a*); the beginning of the Spine of the Scapula (*b*); the Acromion Process (*c*); the Clavicle (*d*); the ligament which ties the outer end of the clavicle firmly to the point of the Acromion Process (*e*); the point or apex of the Coracoid Process (*f*); the shaft of the shoulder bone (*g*). But the head of the shoulder bone is concealed by the muscles, and other soft parts.

Then, of the soft parts, there are seen chiefly these, The great belly of the Infra-Spinatus Muscle (74.), where it lies upon the Scapula black and shining;

shining ; (for every muscle when dissected clean, has a metally-like surface) ; —the belly of the TERES MINOR (75.), the tendon of which twists to be implanted thus into the shoulder bone at (*k*).

The short head of the biceps (*h*) is seen rising from the point of the Coracoid Process (*f*) ; while its longer head (*i*) is seen coming out round and small from the cavity of the joint; The flesh of the CORACO-BRACHIALIS (72.) is seen black, and lying in shadow behind the two heads of the biceps. The two heads of the biceps are not joined to each other till they pass the middle of the arm, *i. e.* below the point where (78.) the number of the biceps is placed.

Lastly, The chief point in this drawing is the Bursa Mucosa marked (*m*) ; which lies on the outside of the Capsular Ligament of the joint ; it is very large, and is surrounded by many smaller ones. This is sufficient to explain the appearance of a Bursa Mucosa ; the use of this great one, lying betwixt the Capsule of the joint and the Acromion Process is easily conceived, and the nature of the smaller ones lying under the point of the Coracoid Process, and under each of the tendons, as of the Teres Major, Latissimus Dorsi, &c. need hardly be explained *.

## FIGURE IV.

EXPLAINS the Elbow-joint ; and also shows the Wrist, but imperfectly.

The three bones which form the Elbow-joint are, the Humerus (*a*) ; the Radius (*b*) ; and the Ulna (*c*). They are all connected with each other by the general Capsule or bag of the joint (*d*), which is derived from the Periosteum, coming off from the shoulder bone above those hollows which receive the Olecranon and Coronoid Processes ; which is in itself thin, and delicate, but is crossed by lateral and Transverse Ligaments, so that it does not appear like a distinct bag ; and therefore the chief demonstration is of the bands, which go across the Capsular Ligament to strengthen it in various directions.

1. The CORONARY LIGAMENT of the Radius is not, as might be supposed, any distinct ligament, but merely a particular form of that part of the General Capsule.

The Coronary Ligament (*e*) is just that part of the General Capsule, which belongs to the head of the Radius. In attaching itself to the neck of the Radius, it seems a little radiated or pursed up at the root (*d*) ; a little higher as at (*e*),

* This is the Bursa which I had seen distended with a prodigious quantity of glairy fluid, and producing a tumor upon the shoulder. *Vid.* Book upon the Joints, page 431.

where it goes over the plain button-like head of the Radius, it is braced very firm; it is indeed hard and cartilaginous, particularly hard and smooth within; and at this point, it is especially strengthened by two Accessory Ligaments; the one (*m*), named the ANTERIOR ACCESSORY LIGAMENT, is hardly to be distinguished from the fore-part of the General Capsule, which is irregular and very lax. This accessory Ligament is almost mixed with the lower part of the Capsular Ligament; being in fact but a stronger band of the general Capsule, the Capsule being stretched over the point of the Coronoid Process of the Ulna. But there is another strengthening of the Capsule, which forms a more distinct and stronger Accessory Ligament for the Coronary Liagment of the Radius: This Accessory ring of Ligament is marked (*n*), and rises from the sharp edge of the Coronary Process of the Ulna.

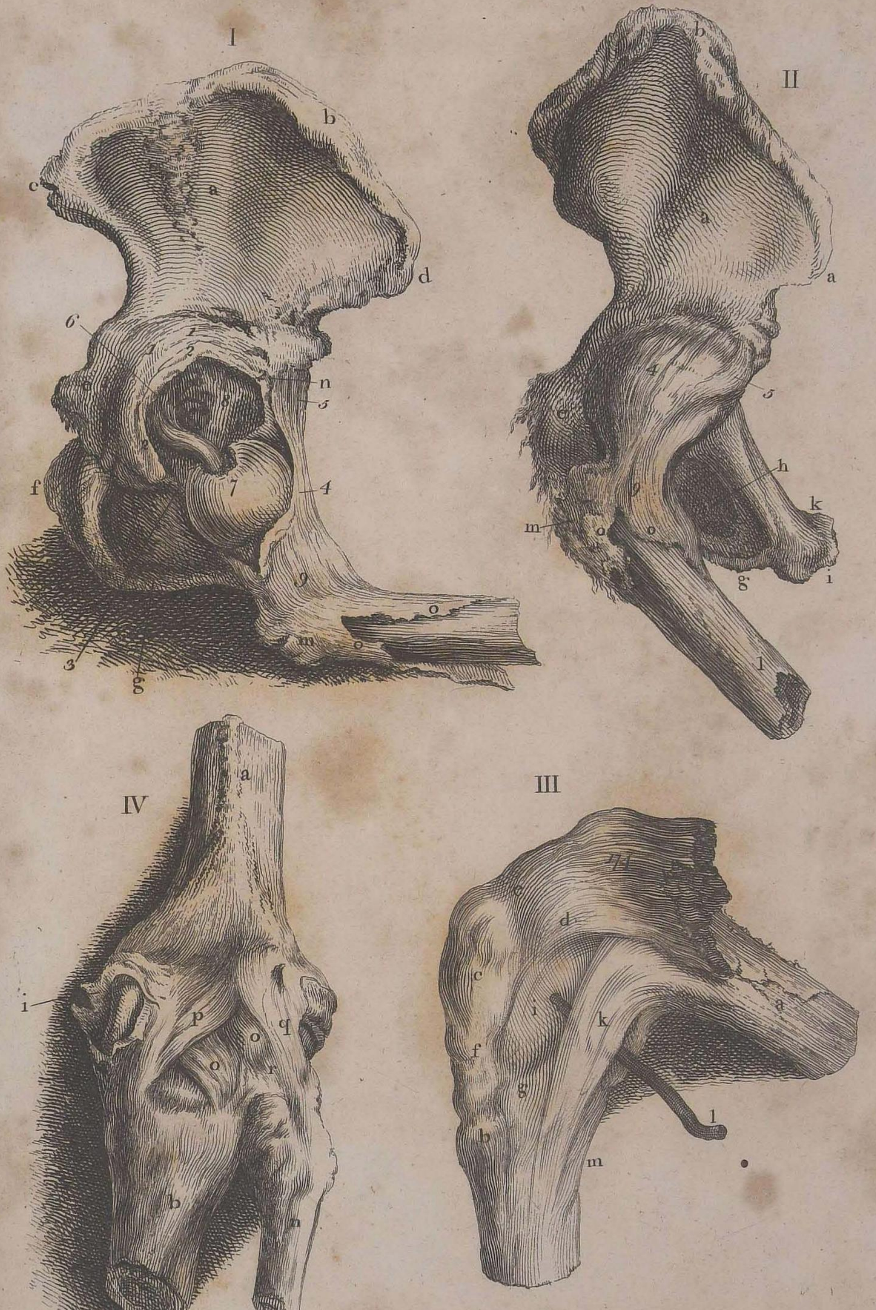
And lastly, the two INTERNAL LATERAL LIGAMENTS, or the strengthenings of the Capsule by slips of Ligament, which come from the Condyle are marked (*o o*). There are generally two as here represented; but sometimes they are united into one larger ligament. These two small but strong slips of ligament go from the inner Condyle of the Os Humeri to the root of the Coronoid Process, where it rises from the body of the Ulna.

The INTER-OSSEUS LIGAMENT, which passes betwixt the Radius and Ulna, is marked (*p*); its stringy fibres are seen, and also the holes by which arteries and veins pass from the fore to the back parts of the fore arm. One particular slip of ligament marked (*q*), is named CHORDA TRANSVERSALIS CUBITI; and is always found of this form, stretching from the Radius below its Tubercle, to the Coronoid Process of the Ulna.

In the lower part of the same drawing, we have the wrist-joint, where (*r*) marks the Scaphoid Cavity of the Radius (*s*). The moveable Cartilage, small and Triangular, which represents the head of the Ulna in this joint (*t*) points out the oval form of this cavity by circumscribing it; (*u*) shows the round head of theOs SCAPHOIDES; (*v*) shows a similar round Articulating Surface of the Os LUNARE; and it is here seen, that these two are the chief bones on the part of the Carpus, and that they form together an oval head which, corresponding with the oval form of the Scaphoid Cavity of the Radius (*r*), makes the wrist-joint a regular hinge, not capable of lateral motions.

The Capsule of the wrist which incloses these bones, to form them into a joint, is seen here with its cut edges marked (*t*); for the lines from (*t*) serve at once to circumscribe the joint, explaining its oval form, and to mark the cut edges of its Capsule. (*x*) Marks the cross Ligament of the wrist which binds the tendons down into the deep hollow, which is represented here; and (103.) marks the Abductor Pollicis.

PLATE

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# PLATE II.

*This Plate explains the Text Book, from Page 239, to Page 452.*

THE two first figures of this plate explain the Hip-joint; of which the chief parts are the socket, the head of the bone, the Capsule, and the Central Ligament of the joint.

THE Os ILIUM is marked (*a*); the wrist or spine of the Ilium is marked (*b*); the Posterior Spinous Processes of the Ilium (*c*); the Anterior Spinous Processes are marked (*d*); the Spinous Process of the ISCHIUM, is marked (*e*); and the Tuberosity of the Ischium, the lowest point of the Pelvis, upon which we sit, is marked (*f*); the Ramus or leg of the Ischium, joining the leg of the Pubis, is marked (*g*); the Thyroid hole (*h*); the Symphisis Pubis (*i*); and the crest of the Pubis (*k*); the shaft of the thigh bone is marked (*l*): the great Trochanter is marked (*m*); and the head of the bone is marked (7).

The parts of the joint are marked with numbers, thus,

(1.) Is the bony margin of the Socket where it is formed by the Tuberosity of the Os Ischium; there the socket is very deep.

(2.) The Cartilage which encircles the brim of the socket, making it still deeper and more secure.

(3.) A part of the circle of the socket opposite to the Thyroid hole, where the socket is exceedingy shallow, or where rather the bony margin of the socket is wanting, and its place is supplied by a Ligamentous substance.

(4.) Is the Capsular Ligament of the hip, which is the strongest in all the body. The thick cut edges of the Bursal Ligament are seen here; and the ligament is seen to come off at (*n*,) from the Cartilaginous borders of the Acetabulum, being truly (as it is explained in the description of this joint) a continuation of the Perichondrium, or membraneous covering of the Cartilage, consisting of two Cancellæ, one of which comes from the Internal Surface of the Socket, while the other comes from the outer surface of the bone, and both of them are condensed into the Bursal Ligament.

(5.) Is a strengthening of the General Capsule, or what may be called the Accessory Ligament, coming down from that little Bump which is named the INFERIOR ANTERIOR SPINOUS PROCESS of the Os Ilium; and this Accessory Ligament is best seen in figure ii. where the Capsule is preserved entire, chiefly for the purpose of showing this strengthening or supplementary band.

(6.) Is the CENTRAL LIGAMENT, which is commonly called the round ligament, though it is truly of a Triangular form; rising by a broader basis at (6.) from the centre of the socket, and implanted small, neat, and round into that dimple which is seen in the drawings of the thigh bone, in the very centre of its globular head; indeed the dimple made by the insertion of this ligament is well seen here at (7.)

(8.) In the deep part of the socket, where this figure is placed, we see dimples irregularly hollow, which are the beds for lodging the MUCOUS DUCTS of the joint, or what has been called, though not truly, the SYNOVIAL GLAND; and at these hollows there are Frenulæ, or little tongues of the inner membrane of the socket, which hold these Mucous Ducts in their place; there are also little Frenulæ round the neck of the bone, especially at its root, which conduct the Mucous Ducts, which lie there.

These are the Frenulæ, or little ligaments, which I meant to enumerate in page 440, by saying "that there are two Internal Ligaments belonging to this "joint, *viz.* the great INTERNAL CENTRAL, or round ligament as it is called, "and these smaller MUCOUS Ligaments."

(9.) Is the root of the Bursal Ligament, for it embraces not merely the head, but also the neck of the bone; and it is here explained how the Periosteum (*o*), which is seen torn up from the shaft of the thigh bone, goes off from the bone at (*g*), in the form of Bursal Ligament, so that the Bursal Ligament and the Periosteum are continuous, being different modifications of one membrane.

## FIGURES III. AND IV.

ARE drawings of the outside of the knee-joint, for explaining the General Capsule of the joint, and especially for explaining the strengthenings of the Capsule, which are known by the names of Lateral and Posterior Ligaments.

FIGURE III. shows the inner side of the knee-joint, with the great Internal Lateral Ligament. (*a*) Marks the thigh bone; (*b*) the Tibia, and the letter is placed upon that bump, which receives the tendon of all the Extensor Muscles; (*c*) the Patella appearing through the tendinous expansions which cover all the joint.

There

There is left here a part of the fleshy belly of the Vastus Internus Muscle (174.) This belly expands into the form of a thin tendinous fascia, which goes over the common Capsule of the joint at (*d*), to strengthen it. It is at (*e*), that the broad tendon of the Vastus Internus is inserted into the Patella; and (*f*) is the strong LIGAMENT of the PATELLA, which comes down from the pointed lower end of the Patella, which though it is called Ligament, is merely the thick and tough tendon by which all the muscles, which extend the leg, as the RECTUS, VASTI, and CRURÆUS, are fixed into the knob (*b*), upon the head of the Tibia. (*g*) Marks that margin of the head of the Tibia upon which the Semi-lunar Cartilage plays, and this sharp edge is seen here shining through the Capsule of the joint. (*i*) Marks the Capsule of the joint itself, thin and delicate at this point (by the side of the Patella). (*k*) Marks the great INTERNAL LATERAL LIGAMENT, which is sometimes named LIGAMENTUM LATUM INTERNUM, from its great breadth. It is not merely a strengthening of the common Capsule, as the Lateral Ligaments of the elbow-joint are, but is a firm and distinct ligament, bright and glistening with silvery lights upon it like mother of pearl, of full three inches in length, very regular and formal, of a triangular shape, rising by a broad basis from the inner Condyle of the thigh bone, inserted by a smaller and more pointed end into the head of the Tibia; and stretching down the bone so as to mix gradually with the Periosteum, and with the General Fasciæ or Tendinous Expansions, which go out over the fore parts of the Tibia. And that it may be understood, how little this Ligament is connected with the Capsule, and how fairly it is entitled to the name of the Lateral Ligament, I have dissected it so as to thrust a piece of Bougie (*l*), under the middle of the ligament, where it passes over the middle of the Capsule. Behind this at (*m*), there is a band of ligament lying, and in the direction of the greater ligament, which might almost be named as a lesser Internal Lateral Ligament, but which is described only as a strengthening of the greater one.

FIGURE IV. at the same time that it explains the Posterior Ligaments, represents also the Lateral Ligaments on the outer side of the joint. (*a*) Marks the thigh bone; (*b*) the Tibia; (*n*) the Fibula; (*i*) the Bursal Ligament of the joint, so cut as to expose the inner Condyle of the thigh bone, naked and shining.

This Bursal Ligament is strengthened every where behind, by irregular strings of ligament passing over it in all directions, but chiefly oblique, and one of these oblique Fasciculi or bands is generally so very strong, as to deserve the name of Ligamentum Posticum. So I have marked the irregular Fasciculi

ciculi (*o*), and I have marked the more formal Ligament the Ligamentum Posticum Winslowii *p*).

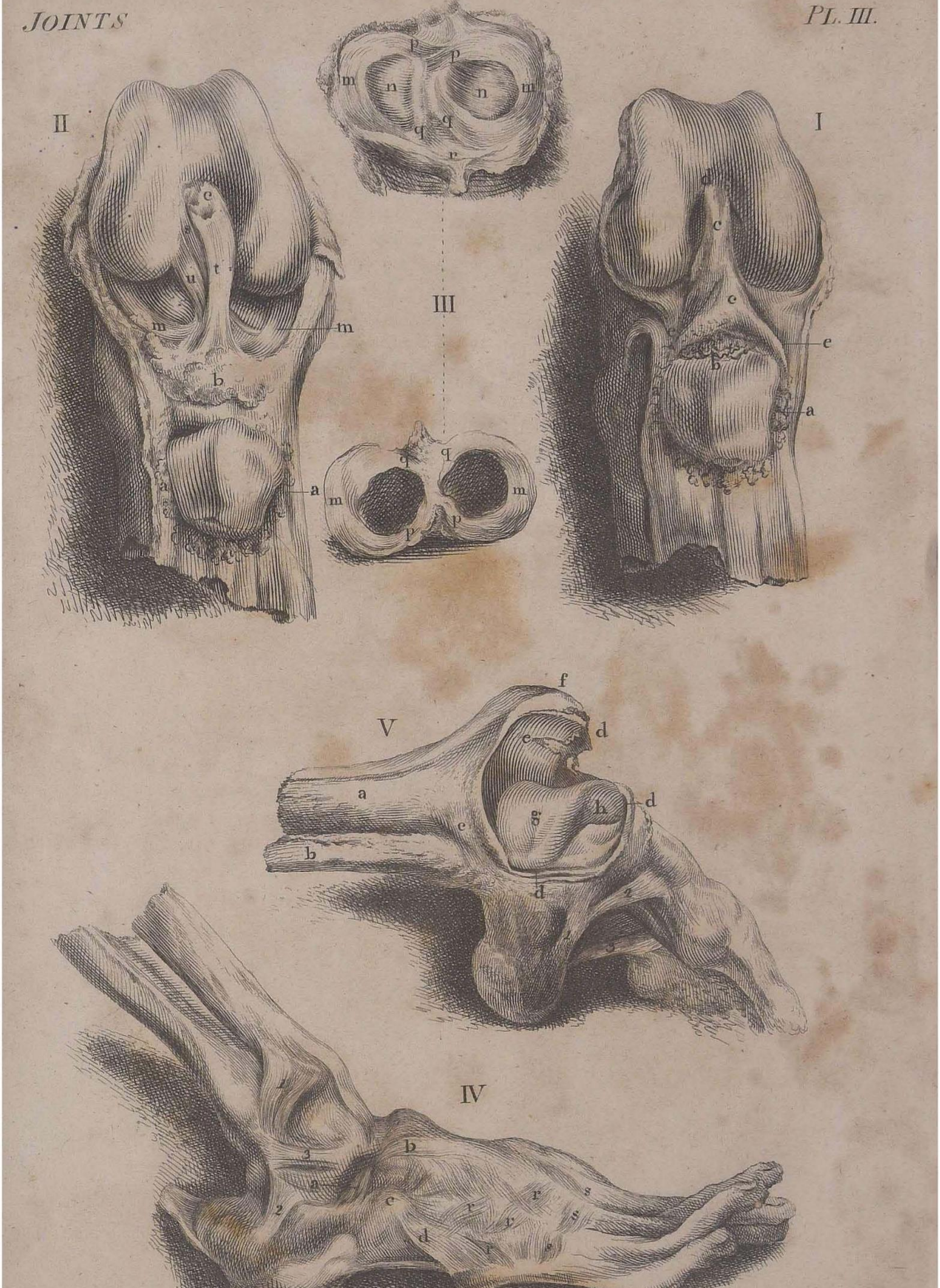
The great LATERAL LIGAMENT on the outer side of the knee-joint is marked (*q*). It is here seen, that the EXTERNAL LATERAL LIGAMENT is not so flat as the Internal one, that it does not lie so fairly as the Internal one upon the side of the joint, but that it inclines a little towards the back part; and it is seen in the drawing as I have explained it in the book, that the proper External Ligament, the LIGAMENTUM LATERALE EXTERNUM LONGUM (*q*), is a large and strong ligament, proceeding from the outer Condyle of the thigh bone, and fixed into the head of the Fibula; but that the LIGAMENTUM EXTERNUM LATERALE BREVIUS vel MINUS (*r*), has not the true form of a Lateral Ligament coming down from the Condyle, but is a mere strengthening or outward band of the Capsule, rising upwards from the knob of the Fibula.

So that in these two drawings, iii. and iv. are seen, all the chief parts on the outside of the knee-joint.

1. The bones as, (*a*) the thigh bone, (*b*) the Tibia; (*c*) the Rotula or Patella; (*m*) the Fibula; and (*f*) the strong Ligament of the Patella, a part which is properly arranged with the bones.
2. There is the Capsule and parts connected with it, as (*i*) the thin membrane of the Capsule itself; (*d*) the fascia or expanding tendon of the Vastus Internus spreading over it, to strengthen it.
3. The Lateral and Posterior Ligaments, as (*k*) the INTERNAL LATERAL LIGAMENT, flat, strong, and almost triangular; with a small ligament (*s*) to strengthen it; (*q*) the great EXTERNAL LATERAL LIGAMENT rounder and more oblique; which (in its turn also) is strengthened by a smaller ligament (*r*). And Lastly, the strengthenings on the back part of the joint, which are irregular at (*o*), and which form sometimes a more regular Ligament at (*p*), the LIGAMENTUM POSTICUM WINSLOWII.

This Anatomy of the knee-joint is continued in the two first figures of next plate.

PLATE




*Published for Longman & Rees, 1804.*

THE TANJORE MAHARAJA SERFOGI'S ... AL. *

# PLATE III.

*This Plate explains the Text Book, from Page 443, to Page 452.*

THE Anatomy of the knee-joint is continued in this plate. It explains the internal parts, the knowledge of which is more valuable than of the external parts, in proportion as internal diseases of this joint are more frequent than luxations, which never happen except in those terrible injuries, where all the soft parts belonging to the joint, are entirely torn up by the roots, so that the limb cannot be saved. The chief parts to be observed within the joint are the fat, and Mucous Membranes, which lubricate the joint, the Ligaments or Frenulæ, which order and regulate the motions of these fatty masses and fringes, the Semilunar Cartilages which, like friction wheels facilitate the motions of the joint; and Lastly, the great Crucial Ligaments by which the joint is strengthened within, the Crucial Ligaments alone being stronger than the whole of those Ligaments which are to be seen on the outside of the joint.

## I. The Fat.

THE fat which is for lubricating the knee-joint, though it is not entirely confined to the circle of the Patella, yet it chiefly surrounds it; and with the fat there are many fringes of the Mucous Ducts; much fat is found at each side of the Patella at (*a a*), but the chief collection is at the lower part of the Patella. At (*b*) figure i. this fat appears peeping out from under that ligament, by which its motions are regulated; but at (*b*) in figure ii. the ligament is cut away, and all the fat is freely seen.

This collection of fat and Mucous Ducts makes a rising upon each side of the Patella, marked with a deep and smooth sulcus round the edge of the bone; and this hanging of the fat on each side of the Patella, is named by Weidbright the Ligamentum Alare Majus, where it hangs in the inner side of the Rotula; and Ligamentum Alare Minus, where it projects less at the

outside of the Lotula; (*Vid.* (*a a*) figure i.) But all this is quite arbitrary; these are not ligaments, nor do they tie any other part; they are but looser foldings of the inner coat of the Capsule, where it rises over the inner surface of the Patella, and where it holds larger globes of fat, or conducts the fringes of the Mucous Follicules.

### 2. The Mucous Ligament.

These bundles of fat are tied by a true ligament (*c*), which properly belongs to them. But to understand this ligament and its names, it must be observed, that the two Lunar Cartilages are moveable; that the two horns of the Lunar Cartilages are tacked together by a little Transverse Ligament; and that this Transverse Ligament is again connected with the little mass of fat, which lies under the lower border of the Patella; and lastly, it is to be remembered, that these fatty bundles are chiefly intended for conducting and defending the Mucous Ducts or fringes. Now the ligament (*c*), figure i. which regulates at once the positions of all these parts in the various motions of the joints, has been named "Ligamentum Mucosum," by Vesalius, he referring it to the Mucous Membrane; it is named, "the Ligament moving the Semi-lunar Cartilages" by Chesselden; it is named, "Ligamentum Internum Longitudinale," by Walther, because of its running down exactly in the middle of the joint; it is named not unfrequently "Ligamentum Gracile" from its delicacy. Weidbright seems to call it (in one place at least) "Frenulum Pinguedinis Glandulosæ;" and he concludes with a question, whether this in place of being a distinct Ligament be not rather a continuation of his two Aliform Ligaments.

But the nature of this ligament is very distinct. It is a regular ligament of a very constant form, and having very curious uses; it is a ligament tolerably thick, but of a soft and membranous nature It is small and pointed above as at (*d*), where it rises from the interstice betwixt the two condyles of the thigh bone; it gradually broadens downwards, so as to acquire rather a triangular form, terminating by a broad base near the root of the patella at (*e e*). It lies in the fore part, or rather perhaps in the centre of the joint in the middle behind the patella, and before the Crucial Ligaments. Its basis spreads out into two limbs (*e e*); one going to the right side, and the other to the left, and this forking of it is named by Walther LIGAMENTUM TRANSVERSUM SEMICIRCULARE*; calling the upper and smaller part of this ligament the Longitudinal Ligament; while he names the basis and broader part of the ligament the Transverse Ligament, and it is under this

* So Walther names as Transverse Ligament those parts which Weidbright marks by the names of Ligamentum Alare Majus and Minus.

root

root or transverse part of the mucous ligament that the fat which it confines is seen peeping out at (*b*).

This ligament then, (which in place of dividing thus curiously into Longitudinal and Transverse or Alar ligaments, may be described under the general title of Mucous Ligament), is of considerable size, being almost of the thickness of the little finger, and is the part that is seen when the joint is first opened; not firm and hard like those ligaments which tie the bones, but soft, delicate, and membranous, fit for its office of conducting the mucous ducts in safety, and regulating the motions of the fatty bundles. It is small at (*d*), where it comes off from the great Sulcus betwixt the condyles, It grows broad at its root, being there so large as to fill up all the empty space in the joint. It assumes at its lower part a triangular or prismatic form, with one flat side directly forwards, and the other angle of the prism looking backwards in the joint, and covering the crucial ligaments which lie in the back part of the cavity. After enlarging at its basis, it degenerates into a soft mucous or membranous covering for the fat and mucous glands; thus it is connected at its root with the lower edge of the patella, with the fat and mucous fringes, and with the fore horns of the Semilunar Cartilages. So that this ligament moves in every motion of the joint, as the thigh-bone from which it rises moves, it is moved the more from its connection with the patella, and as this ligament moves along with the patella, it in its turn moves the Semilunar Cartilages and the bundles of fat; and keeps them fixed, or draws them forwards; for were the fat permitted to move backwards, it would be bruised directly betwixt the bones with a force that would destroy it; and thus the mucous ducts not only by the elasticity of the fat which surrounds them, start out from betwixt the bones when they press too closely; but the fat together with all the glands which belong to it is so held forward by this mucous ligament as to lie always in the free and open part of the joint.

This ligament was thought by the ancients to be sometimes wanting, though this cannot be true of a part so essential to the sound constitution and free motions of the joint. It is believed by some, that it may be torn in sudden and violent bendings of the knee; it surely is the part the most subject to disease, since we find it in ulcerated joints quite corroded. It is plain that this part must be most peculiarly subject to inflame, since it is continually working in every motion of the joint; it is not only delicate in itself, but is connected with all the more delicate parts; for the inner membrane of the capsule is continuous with this Mucous Ligament; the fat that surrounds the patella is continuous with it; it conducts the fringes or ducts of the chief mucous glands; it is itself a secreting surface, and the move-

able or Semilunar Cartilages are tied to it; by all which circumstances it becomes too important in the œconomy and diseases of this delicate joint to be passed slightly over.

### 3. The Moveable Cartilages.

The two Moveable Cartilages are not seen in Fig. 1. because the mucous ligament which covers them is entire. In Fig. ii. they are marked (*m m*). The letters (*m m*) touch the outer edges of the cartilages, where their outer margins adhere to the inner surface of the capsule.

The parts and connexions of these cartilages are better explained in Fig. iii. where (*m m*) still mark tbe outer circles which adhere to the inner surface of the capsule. The letters (*n n*) mark the thinner edges, and show the space in the centre of each cartilage which holds the condyle of the thigh-bone. (*p p*) Mark the two posterior horns and the little tags of ligament by which they are tied to the crucial ligaments behind. And (*q q*) mark the two anterior horns, and the little tags of ligament by which they are tied to the root of the mucous ligament before. And (*r*) marks a little cross ligament by which the two anterior horns are connected with each other, and which is named Ligamentum Transversale Commune.

### 4. The Crucial Ligaments.

Are well seen in Fig. ii. where (*c*) marks the part from which the pointed origin of the mucous ligament was cut away. And by cutting away that ligament, the Crucial Ligaments which, in Fig. i. are covered by the mucous or central ligaments, are in this drawing brought into view.

The Crucial Ligaments lie both in the back part of the joint, and touch that part of the Capsule, which lies in the Ham; but one of them (*s*) lies behind, whence it is called the Posterior Ligament, and the other (*t*) though it lies flat upon the Posterior Ligament, and in contact with it; vet being before it, is named the Anterior Ligament.

The reason of this Anterior Ligament being represented as coming so far forwards as to touch in a manner the root of the Patella, is plainly this; that to take a sure hold of the Tibia it does actually rise over the tubercle in the center of the joint, and goes out flat over all the face of the joint, and the reason of the Posterior Ligament seeming to follow this one, and to come also far fowards in the joint, is, that the ligaments of the horns of the Lunar Cartilages climb upon the fore-part of the Posterior Ligament, and

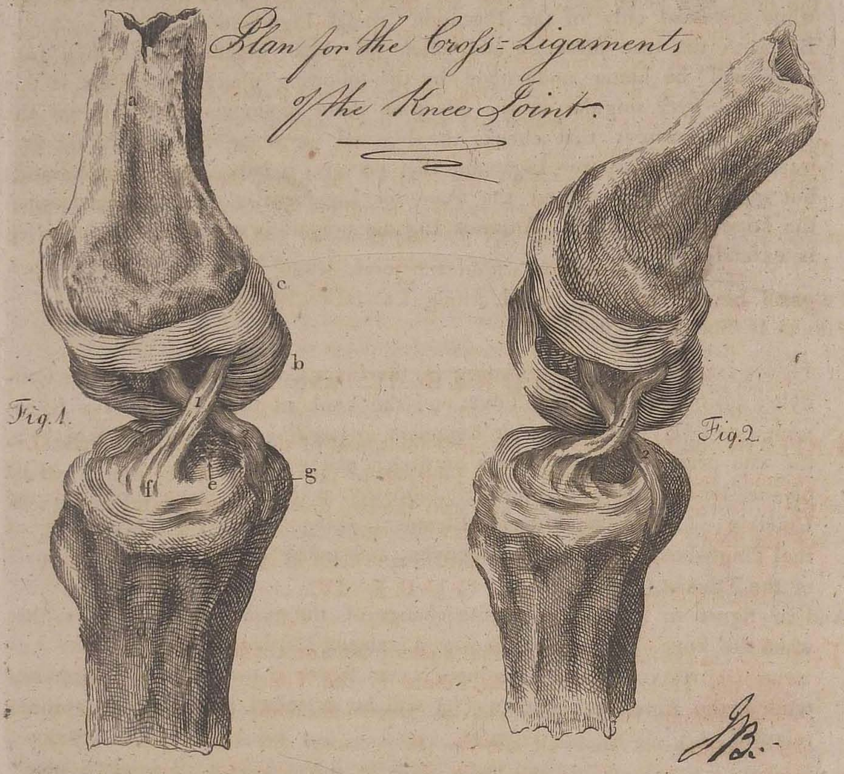
so

it is more properly the Ligament of the Lunar Cartilage that is seen at (*u*), while the head only of the Posterior Crucial Ligament is seen at (*s*.)—— But both the true direction and extent of these Ligaments and their true office will be better understood by the following plan; for there is this one thing very singular in the effect of these ligaments, that it is not the Posterior Ligament that checks the leg and prevents it going too far forwards; nor the Anterior Ligament that prevents it being strained backwards, but quite the reverse; for the Posterior Ligament is most stretched when the knee is bended; the Anterior Ligament again is stretched when the leg is extended.

FIGURE I. Shows the leg extended.
FIGURE II. Shows the knee bent.

In Figure 1st, (*a*) is the Thigh-bone; (*b*) the Inner Condyle; (*c*) the Outer Condyle; (*d*) the head of the Tibia; (*e*) the knob in the center of the Knee-joint; and (1) is the Anterior Ligament arising from the outer Condyle, (viz. the one nearest the eye in this drawing), and going out over the fore-part of the Tibia, and inserted properly into that hollow (*f*), which receives the Condyle; (2) is the Posterior Ligament, rising rather from the center of the Thigh-bone betwixt the Condyles, and going down over the back-part of the Tibia at (*g*).

And in figure ii. it is plain by the change of the position of the bones, that when the knee is bent, the Posterior Ligament (2.) is stretched, and the Anterior (1.) relaxed. And of course, as in figure i. that when the leg is extended, the Anterior Ligament (1.) will be stretched, and the Posterior (2) relaxed.




In these three drawings, all the internal parts of the knee-joint are explained.

1. The FAT which is collected chiefly round the Patella, which perhaps does not exude nor mix with the fluid of the joint, but serves rather by its Lubricity and Elastic nature, to conduct and defend the fringes or Mucous Ducts.
2. The MUCOUS LIGAMENT, which is the first part that is seen upon opening the joint; which lies in the center of the joint; is of a soft and mucous nature; conducts many of the mucous Fringes; and which, descending from the middle of the thigh bone betwixt the Condyles, is attached to the lower edge of the Patella, and to the Semi-lunar ligaments, and so it moves along with the Patella, and moves in its turn the Cartilages and the fat. It regulates the motions of the Cartilages, and it draws forwards the fat, preventing it going backwards, so as to be bruised betwixt the bones.
3. The SEMI-LUNAR CARTILAGES, which are like the labels which are put round the

the neck of a wine flask. They are tied at the horns by ligaments, as the label is hung by its chain; lie flat upon the Tibia, to facilitate its motions, and enable, at the same time, the Condyles of the thigh bone to change their centers of motion, according to the various postures of the joint.

4. The CROSS LIGAMENTS, which are very thick, and strong, lie chiefly in the back part of the joint, and by their going the one over the face of the Tibia, and the other down along the back of the bone, they limit both its motions, the one checking it in too violent bendings of the knee, the other limiting its extensions. So that the motions forwards and backwards are limited by these Cross Ligaments within the joint, while it is secured from irregular Lateral motions by the strong Lateral Ligaments without.

## FIGURES IV. AND V.

EXPLAIN the Ligaments of the ancle joint, and of the foot. All the great Ligaments belonging to the ancle joint, or to the Tarsal Bones are drawn in figure iv. and in figure V. are seen the two great ligaments lying in the sole of the foot.

## FIGURE IV.

THE Ligaments belonging to the ancle joint are these,

(1.) A strong Ligament tying the Fibula to the Tibia. It is large and very strong; commonly it is divided, as here, into two, sometimes into three slips; sometimes they all adhere. It is named the LIGAMENTUM ANTICUM SUPERIUS. There is on the back part of the Fibula a ligamentus membrane, which is like this one, and is named Ligamentum Fibulæ Posticum Superius.

These ligaments connect the Tibia and Fibula so firmly to each other, that they are as one bone with two processes, viz. the inner and outer ancles.

(2.) Is the MIDDLE PERPENDICULAR LIGAMENT, a very strong ligament, which descends directly from the point of the outer ancle, to tie it firmly to the side of the Os Calcis. There are three ligaments tying the outer ancle to the foot; viz. first, this middle one; second, the anterior one; and third, one behind the joint, a posterior ligament. which is not seen. This Middle Perpendicular Ligament, so named from its position, descends directly from the very point of the outer ancle, and it is implanted into the side of the heel bone. It holds the ancle from yielding to one side, and from bending too much; assisting rather the posterior ligament than

than the anterior one. It lies close upon the Capsule, and strengthens it; while the tendons of the Peronæi Muscles glide and rub across it.

(3.) The ANTERIOR LIGAMENT of the outer ancle is for tying the outer ancle to the Astragalus, as the perpendicular one ties it to the heel bone. It goes sometimes in two distinct bands, as represented here. Very often they are scarcely divided; it appearing as one strong unform ligament, white and glistening, passing obliquely forwards from the lowest point of the Fibula to the neck of the Astragalus.

These three are the chief ligaments of the ancle; and the order of ligaments which come next, is of those which tie the Astrgalus to the Os Calcis and to the Os Naviculare.

1st, (*a*) Is a ligament, or rather two or three ligaments which cross the great hole, which, in the drawings of the bones of the Tarsus, is marked with a pencil thrust up through it. This is called the Cavitas Sinuosa; and so these irregular ligaments are named Ligamenta, or APARATUS LIGAMENTOSUS CAVITATIS SINUOSÆ. They are merely irregular ligaments, lying deep in this hollow, and tying the Astragalus to the Os Calcis.

2d, (*b*) Is a ligament which ties the Astragalus to the Os Naviculare. It begins at the neck of the Astragalus; touches the Os Naviculare; goes still forwards, and spreads a little upon the cuneiform bones; and, from this expanding form, is named LIGAMENTUM LATUM. Though there are several bands of ligament on the inner side, they are not so particular, nor so formal in their shapes or uses, as to have any appropriated name.

3d, (*c*) There are ligaments tying the Os Calcis, in its turn, to the Os Naviculare and to the Os Cuboides. The letter (*c*) is placed upon that prominent point of the Os Calcis whence those ligaments go off; and they go somewhat in a star-like form, just as I have drawn them, and not very distinct. And those bands which go upwards tie the Os Calcis to the Os Naviculare;—those which go downwards tie it to the Os Cuboides; for the chief articulation of the heel-bone is with the Os Cuboides.

4th, (*d*) There goes a little slip of ligament, not much noticed from this same point of the heel-bone to that part (*e*) of the metatarsal bone of the little toe, which is very sharp and prominent; and is in all positions and drawings the most remarkable point in the foot.

The ligaments again which tie the several bones of the Tarsus, as the cuboid and cuneiform bones, together are flat, shining, star-like, and very numerous; and, from their lying upon the back of the foot, are named LIGAMENTA PLANA DORSALIA. They are marked (*r r r*); and are too irregular in their form, and too general in their uses, to need any more accurate indication; for these are the ligaments which are so crossed and inter-

woven

woven, "that they form what we may call a web of ligaments, consisting of shining and star-like bundles," of a cartilaginous hardness, adhering closely to the whole surface, and passing from bone to bone over all the surface of the foot. (*t*) Is the Ligamentum Longum, which is marked 3. in the 5th drawing, and is explained in the letter press of that figure.

The ligaments which tie together the Tarsus and Metarsus are also seen here, at the roots of the metatarsal bones. There are lateral ligaments which tie each metatarsal bone to the one next it. But the ligaments which appear chiefly upon this upper surface, are a continuation of the irregular web of ligament belonging to the Tarsal bones; and as this web takes particular shapes in passing along to the several heads of the Metatarsal bones, these are best named, in general terms, LIGAMENTA DORSA- the Dorsal Ligaments of the Metatarsal bones; and they areLIA, marked (*s s s*).

## In FIGURE V.

THE Ancle joint is seen opened. The Tibia and Fibula (*a* & *b*) are turned backwards. Their strong ligament (*c*), which binds them together, is seen; the Capsule, which is clean dissected, is marked (*d*), which shows its cut edges. (*e*) Shows that it is a reflection of the Capsule that lines the cavity of the joint; and the process (*f*) of the outer ancle being turned back, the great head, or the cartilaginous pulley of the Astragalus (*g*), is exposed covered with its smooth cartilage. The flat side of the Astragalus within the joint is also seen at (*h*), where it was embraced by the inner ancle or process of the Tibia (*f*). There is but one ligament to be noticed in this drawing; for

1st, Is a band very strong indeed, which passes from the Astragalus to the Os Calcis. It has, as is seen here, the distinct form of a ligament. It ties the Astragalus and Os Calcis strongly together; and so it has also the office as well as the mere form of a ligament. But it often happens, that the tendon of the Flexor Pollicis runs through this ring; therefore its office as a ligament (which it truly is) is very little noticed.

2d, There is a ligament of the inner ancle, like the perpendicular ligament of the outer ancle. It is of a triangular form; and is hence named Ligamentum Deltoides. A process of this ligament binds down the Tendons of the Tibialis Posticus, and of the common flexor of the toes. Therefore the ligament marked (2), at the same time that it binds the bones of the foot together, holds down the flexor tendons.

3rd.

3d, The figure (3) marks the great ligament of the sole of the foot. It proceeds smaller from the point of the heel bone; it enlarges toward its insertion unto the Os CUBOIDES. It binds these two bones particularly; and, by binding them, it supports very powerfully the whole arch of the foot; and this ligament, which is also very thick and strong, is of such particular length, (the longest ligament of all the Tarsus), that it is called LIGAMENTUM CALCIS LONGIUS. It is seen under the edge of the foot in the drawing, figure iv marked (*t*).

But the truest support of any joint is not its ligaments so much as the muscles which bend it; and it is thus with all the flexor muscles which pass under this great arch of the foot—How could the arch of the foot be sustained, by ligaments of any kind, under the whole weight of the body, and its exertions? Surely it could not be sustained otherwise than by the strong action of the Tibialis Posticus and the flexor muscles of the toes; and when a man stands under a burden, as well as when he walks, this arch is sustained by the continual action of those muscles, the tendons of which pass under the arch.

*FINIS.*

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